IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 7.] September, 1937. [No. 9

DISEASES CAUSED BY BACTERIA AND FUNGI.

BERG, W. N. (1936). **Statistical Interpretation of Data in Experimental Tuberculosis.**—*Tubercle, Lond.* **17.** 496-502. 2 tables. [15 refs.]

Two of the probable causes of disagreement in experiments designed to prove the protective value of anti-TB. vaccines for laboratory animals are the lack of a standard method and the failure to interpret the results on a statistical basis. A detailed description is given of a simple statistical method for testing the difference between the means of small samples, and it is shown that, when errors of random sampling are not taken into account, the validity of the resulting conclusions is seriously impaired.—F. BLAKEMORE.

STEWART, C. A. (1936). **Tentative Comprehensive Diagnostic Standards for Tuberculosis.**—*Amer. Rev. Tuberc.* **33.** 800-812. [15 refs.]

S. considers that progress in the prevention of TB. of human origin has lagged behind that made in preventing bovine TB. The wider use of the tuberculin test for the detection of the disease in man is recommended.—F. BLAKEMORE.

MESSIERI, A. (1934). Contributo sperimentale allo studio della tubercolosi del cavallo. [**Experimental Study of Equine Tuberculosis**].—*Nuova Vet.* **12.** 7-15. 8 figs.

Using a strain of *Mycobact. tuberculosis* originally isolated from a horse which had acquired a natural infection, M. produced TB. in a horse by the injection intramuscularly and intradermally of 20 mg. of culture suspended in 10 c.c. of glycerin broth. The virulence of the strain was low for the usual laboratory animals.

Observations were continued for 11 and a half months, when the animal was killed *in extremis*. Soon after infection, there was a slight but permanent rise in temperature and a general falling-off in condition although the appetite was maintained for the first seven to eight months. Pulmonary symptoms developed early and local skin lesions were present at the site of inoculation. Tuberculin tests were carried out every 30 to 40 days and after the first month positive reactions were always obtained. On *post-mortem* examination, the main lesions were found in the lungs and peribronchial lymph nodes. They were nodular in type and caseation was present.—J. A. NICHOLSON.

PLUM, N. (1936). Undersøgelser over Baciltyperne ved Tuberkulose hos Svin i Midtjylland. [**Bacillary Types in Porcine TB. in Mid-Jutland, Denmark**]. —*Maanedsskr. Dyrlaeg.* **48.** 449-457.

In 21 swine, infected with the avian type of tubercle bacillus, the localization was in the lymph nodes of the intestines only. In 81 cases infected with the bovine type, only 9 showed local changes in the intestinal lymph nodes. P. believes that infection with the bovine type in pigs often occurs by the respiratory route. For the differentiation of the types he made cultures on Löwenstein's medium, using 0·75% and 6% of glycerin. The avian type grows vigorously in both concentrations of glycerin: the first generation of the bovine type grows quite well in the presence of the 0·75% concentration, but not so well on the 6%.—H. B. (STOCKHOLM).

BUXTON, J. B. (1936). **The Role of B.C.G. in the Vaccination of Cattle against Tuberculosis.**—*Edinb. med. J.* **43.** 160-171.

Particulars are given of experiments which showed that the double intravenous method of vaccination, employing doses of 10 mg. followed by 100 mg. of culture, was capable of inducing a complete immunity to the oral administration of virulent organisms three months after vaccination, and that at six months the protection was almost complete; whereas a definite progressive decrease in resistance was evidenced after intervals of from 9 to 12 months.

With the object of determining whether a waning immunity could be reinforced by the administration of a second vaccinating dose at an appropriate interval after the first protective inoculation, a series of calves was revaccinated with a single dose of 100 mg. of BCG., at intervals of 6, 9, and 12 months after the original double inoculation. Only 13 animals were used for the experiment and it was difficult to form any definite conclusion, but the results appeared to indicate that revaccination does not give as good an immunity as primary vaccination.—F. BLAKEMORE.

PALTRINIERI, S. (1935). Lo studio della curva degli anticorpi specifici (sensibilizzatrice antitubercolare) nei vitelli vaccinati col B.C.G. [**Antibody Production by a Heifer Vaccinated with BCG**].—*Nuova Vet.* **13.** 188-195. 3 figs., 5 graphs.

P. carried out experiments to ascertain if calves immunized with BCG can be used for making a serum containing specific antibodies. He obtained six calves and kept them under perfect laboratory conditions. He concludes that subcut. injection of BCG produces specific antibodies in blood serum that reach their maximum 20 or 30 days after the second inoculation, and disappear after the fourth to sixth month.—S. F. J. HODGMAN.

BABLET, J., DUCOURTIOUX, M., & BLOCH, F. (1936). Auto-inoculation intradermique d'une souche de laboratoire de tuberculose bovine; modification consécutive de la virulence. [**Accidental Infection with a Bovine Strain of Myco-tuberculosis**].—*C. R. Soc. Biol. Paris.* **123.** 1086-1088. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 457. Signed S. ROODHOUSE GLOYNE].

The authors record an incidence of accidental contamination of the skin of the thumb in one of them, with the well-known bovine strain [Vallée] of tubercle bacillus which has been subcultured for many years in the Pasteur Institute until it is now harmless to the rabbit in a dose of 1/100th of a mgm. intravenously. The nodule resulting from an accidental contamination was slightly cyanosed and keratinized and was removed by electrocurettage 62 days after the infection. Histologically, the nodule proved to be tuberculous and cultures made by the Löwenstein technique showed colonies on the 24th day. These cultures were

inoculated into the rabbit intravenously [1/100th of a mgm.] and intracerebrally, and into guineapigs intraperitoneally. The animals showed typical lesions of tuberculosis and the authors concluded that the strain had returned to its normal virulence after sojourn in the human skin.

PALTRINIERI, S. (1936). Sulla profilassi delle infezioni da Bacillo pyogenes. [**Prevention of** *Corynebact. pyogenes* **Infection (in Cattle)**].—*Nuova Vet.* **14.** 68-72.

Since there is no effective method of vaccination, P. recommends the elimination of all sources of infection with *C. pyogenes*. In an affected herd healthy animals should be isolated, and those suffering from abscesses should be destroyed. Milk from cows affected with mastitis should not be given to pigs, since GRIPS found *C. pyogenes* to be a complication in swine fever.—S. F. J. HODGMAN.

KÖBE, K. (1937). Unterscheidung der Influenzabakterien von den Pasteurellen. [**The Differentiation of Influenza Bacilli from** *Pasteurella*].—*Zlb. Bakt. I. (Orig.).* **138.** 158-163. [11 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 305. Signed W. W. C. TOPLEY].

The author describes the characters that serve to differentiate influenza bacilli from *Pasteurella*. The object of this description is the demonstration that the organism isolated by KAIRIES from ferrets experimentally infected with influenza, and called by him " *Bact. influenzae putoriorum multiforme* " is not a member of the haemophilic group, but a species of *Pasteurella*. The demonstration is entirely convincing.

KNOTH, M. (1936). Typendifferenzierung an 561 Gärtnerstämmen aus Schlachttieren. [**Type Differentiation in 561 Colonies of Gärtner's Bacillus from Slaughtered Animals**].—*Zlb. Bakt. I. (Orig.).* **136.** 441-444. 3 tables. [13 refs.]

561 strains of *Salmonella enteritidis* isolated from animals slaughtered at Leipzig from 1930 to 1935 were classified into varieties according to their biochemical reactions in rhamnose and arabinose broth, in rhamnose and arabinose milk (Bitter), and in Stern's glycerin fuchsin broth. [No serological subtyping was carried out]. The varieties Jena, Rostock, Kiel and Ratin (Danzig) were isolated from bovines, but 94% of the 556 strains isolated from these animals proved to be Kiel. This variety was also isolated from 4 sheep and 1 horse.

Common lesions in affected adult bovines were metritis, mastitis and gastroenteritis, whilst over 400 calves showed miliary necrotic foci in the liver and splenic enlargement.—E. J. PULLINGER.

I. WEBER. (1936). Bekämpfung der Enteritis als Folge einer Infektion mit Bact. enteritidis (Gärtner), breslaviense oder Paratyphus B (Schottmüller). [**Bovine Paratyphoid Carriers**].—*Berl. tierärztl. Wschr.* **52.** 599-601.

II. LERCHE, M. (1936). Weitere Untersuchungen über die Epidemiologie des Bacterium enteritidis Breslau. IV. Haltbarkeit von Enteritis-Bakterien in der Aussenwelt. [**Epidemiology of** *Salmonella enteritidis* **Breslau. IV. Viability in Nature**].—*Tierärztl. Rdsch.* **42.** 758-763. 5 tables. [See also *V. B.* **7.** 351].

III. LERCHE, M. (1936). Untersuchungen über die Epidemiologie des Bact. enteritidis Breslau. Kritische Schlussbetrachtung. [**Epidemiology of** *S.e.* **Breslau**].—*Ibid.* 776-779. 1 fig. [Numerous refs.]

IV. KLIMMECK. (1936). Erfahrungen mit der planmässigen Bekämpfung der Enteritis in den Rinderbeständen. [**Control of Paratyphoid Enteritis in Cattle Herds**].—*Dtsch. tierärztl. Wschr.* **44.** 859-860.

I. The danger to public health of acute and chronic outbreaks of enteritis amongst cattle due to *S.e.* is emphasized, and illustrated by citation of the records of a very acute epidemic of such enteritis with several deaths which simulated anthrax. In W's opinion all suspected cases of anthrax in which laboratory examination fails to support the diagnosis should subsequently be examined for salmonella infection. All other cases of mild or acute alimentary disorder of obscure origin should be similarly treated. Identification of infected animals is based upon repeated cultural examinations of samples of faeces, and upon agglutination testing. Following the identification of infected animals and their disposal, control is based upon hygienic measures.

II. The author failed to isolate *S.e.* from 469 samples of water collected from natural sources and likely to be contaminated with this organism. Clean and algae infested water was inoculated artificially with *S.e.* and stored in earthenware basins at 17°C. The organism was re-isolated from both types of water 15 to 20 days later. Extremes of atmospheric temperature and the presence or absence of daylight did not influence the survival time in water. In samples of faeces the organism survived less than a week if the faeces were in a moist state but survived several months in dried samples. Egg shells smeared with contaminated bird faeces and dried still carried viable organisms 5 months later. *S.e.* was isolated many months later from soil which had been sprinkled with contaminated faeces and it was isolated from snails some months after they had been in contact with infection. [Data regarding the duration of viability of *S.e.* on soil should be accepted with reserve owing to the danger of periodic recontamination of the area by rodents or birds].

III. The frequency with which *S.e.* infection may be found in domestic animals is re-emphasized. The organism has frequently been isolated from cattle and less frequently from pigs, horses, geese, ducks and turkeys. Serological tests are valuable for the preliminary identification of potential carriers of infection. From the public health view point the epidemiological cycle is as follows. Infected birds are dangerous (a) on account of laying infected eggs, and (b) having infected flesh when slaughtered.

Infected birds and rodents disseminate infection by distributing their contaminated faeces on the foodstuff of other animals. In this way human food may be contaminated directly, or the contamination of material fed to domestic animals may cause active infection and subsequent transfer to the human being in milk, meat or eggs.

IV. Control involved the identification of infected individuals by clinical examination and by serological and cultural tests. Clinical examination was not found to be a satisfactory procedure. A large number of infected cattle were identified and destroyed.—E. J. PULLINGER.

I. GOW, A., Jr., & HAMILTON, A. B. (1935). **Bang's Disease. The Economics of Some Aspects of this Disease in Dairy Cows.**—*Bull. Md agric. Exp. Sta.* No. 387. pp. 391-394. 1 table. [1 ref.]

II. EVERSON, C. L., POELMA, L. J., & BRUECKNER, A. L. (1935). **The Relation of Blood and Milk Sera Agglutination Titres to Udder Infection in Bang's Disease.**—*Ibid.* pp. 395-400. 1 table. [8 refs.]

III. KITSELMAN, C. H. (1936). **One Thousand Cows Testing Suspicious (1 : 50) to the Bang Agglutination Test and Their Subsequent Test Behavior.**—*J. Amer. vet. med. Ass.* **89.** 678-680. 4 tables.

I. Figures given by an average of 74 cows with positive reactions to tests for *Brucella abortus* infection, and 222 cows with negative reactions, over a period of four years showed the following averages :–

	In positive reactors.	In negative reactors.
Services per conception	1·79	1·48
Calves per year	0·86	1·07
Milk per cow	6,330 lb.	6,844 lb.
Fat in milk	251·6 „	281·6 „

II. Blood tests and the examination of milk from 714 cows confirmed that the higher the blood titre, the greater the probability of udder infection, and that, although a negative milk serum did not indicate freedom from udder infection, a high milk serum titre was more indicative of udder infection than was a high blood titre. There was no evidence of udder infection in any cow with a negative blood titre.

III. One thousand cows reacting at a titre of 1 : 50, which was considered a suspicious reaction, were retested at intervals of five months. At the first retest 601 were negative, 231 positive, and 168 doubtful; of these 168 at the second retest, 133 were negative, 34 were positive, and only one remained doubtful. The data given do not permit a comparison to be drawn between the number of doubtful reactors that became positive and the number of negative animals that become positive.—H. H. Holman.

Demidenko, I., Gervjatovskij, A. P., & Kapitanski, M. V. (1936). Brucella-infekcija i ee otnošenie k chirurgičeskim zabolevanjam lošadej. [**Brucella Infection in Fistulous Withers and other Surgical Conditions of the Horse**]. —*Uchen. Zap. Vitebsk vet. zoo. Inst.* **4.** 131-142. 1 table. [14 refs.] [German summary].

Agglutination, skin and cultural tests were made on nine horses with poll evil, 16 with fistulous withers and five with lesions elsewhere. Brucella could not be grown from any of the poll evil cases, but one gave a positive reaction to the aggl. and skin brucella tests. Brucella were grown from only two of the fistulous withers cases, but three of the horses gave positive aggl. reactions and skin tests. No cultures and no aggl. or skin reactions were obtained from the miscellaneous suppurative cases.

Petersen, G. (1936). Retningslinier ved bekaempelsen af kvaegets smitsomme kastning (abortus Bang). [**Directions for the Campaign against Contagious Abortion (Denmark)**].—*Maanedsskr. Dyrlaeg.* **48.** 353-362. [3 refs.]

At present it is considered to be impossible to carry through a fixed scheme of control under state direction. Provisionally it is proposed that the state should assist such owners as agree to follow an eradication programme drawn up by the veterinary directorate. It is also suggested that the local veterinarians should all use the same system. Instructions on hygienic measures, blood-sampling, isolation, etc. are given.—H. C. Bendixen (Copenhagen).

Pérès, G., & Granon-Fabre, P. (1936). Recherches relatives à la présence de Brucella melitensis dans le lait et les fromages de chèvres. [*Br.m.* **in Milk and Cheese of Goats**].—*Bull. Soc. Sci. vét. Lyon.* **39.** 110-113. 1 table.

Br. m. was detected by g. pig inoc. in the milk of ten goats which, along with sheep, had been vaccinated 11 and 4 months previously with an *abortus* strain, in an attempt to control a pre-existing outbreak of abortion.

Several samples of cheese were made from the goats' milk, and *Br.m.* was again recovered by g. pig inoc., from a sample which had been maturing for 20 days, but not from samples maturing for 6, 10 or 17 days.—J. E.

SIEVERT, Lena. (1936). Untersuchungen ueber den Antigenaufbau in der Brucellagruppe. **[Observations on the Antigenic Structure of the Brucella Group].** —*Z. ImmunForsch.* **89.** 249-259. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 309. Signed G. S. WILSON].

As the result of a series of quantitative absorption reactions the author concludes that the antigenic structure of the Brucella group is essentially similar to that suggested by WILSON and MILES. No difficulty was experienced in the preparation of monospecific sera, but it was noted that greater care had to be taken in the absorption of *melitensis* than of *abortus* sera, in order not to remove both the major and the minor agglutinins. In further work it was found that all agglutinins could be removed from *melitensis* sera by absorption with *abortus* or *suis* strains, but that a similar complete absorption of all agglutinins from *abortus* or *suis* sera by *melitensis* strains was not possible. For this reason it is suggested that *abortus* and *suis* strains contain an antigenic component that is lacking in *melitensis* strains. [This last conclusion is of considerable interest, but will demand confirmation by experiments made with freshly isolated *melitensis* strains. The strains used by Sievert, though smooth were apparently fairly old, and it may be that some antigenic degradation had occurred].

LESBOUYRIES, & BERTHELON. (1936). L'entéro-toxémie infectieuse du mouton. **[Infectious Enterotoxaemia of Sheep].**—*Rec. Méd. vét.* **112.** 577-594. 2 tables.

A general brief review of the subject.—A. WILSON TAYLOR.

PASTERNACK, J. G., & BENGTSON, Ida A. (1936). **The Experimental Pathology and Pathological Histology Produced by the Toxin of Vibrion Septique in Animals.**—*Nat. Inst. Hlth Bull.* No. 168. pp. iv+46. 13 figs. on 10 plates. [14 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 308. Signed G. S. WILSON].

Advantage was taken of an immunological study concerned with the determination of the lethal dose of *Cl. septique* toxin and the titre of antitoxic serum to investigate the histological changes produced by the toxin in laboratory animals. Altogether 62 rabbits, 76 mice, 10 guineapigs, and 8 pigeons were submitted to examination. Intramuscular or subcutaneous inoculation of toxin produced local necrotic lesions only, which later healed. On the other hand, intravenous inoculation proved fatal, the time to death being inversely proportional to the size of the dose. Thus in rabbits, a dose of 20 mgm. of standard dried toxin per kilogram proved fatal in about 5 minutes, while a dose of 1-2 mgm. per kilog. did not usually cause death for 2-12 hours, and sometimes did not prove fatal at all.

Histologically, in all the animals studied the brunt of the toxin seemed to fall on the heart muscle. This is in confirmation of the observations of previous workers such as LAUTENSCHLÄGER (1919), STRAUB (1919), and BUTTLE and TREVAN (1928). In most animals surviving any length of time there was intense capillary engorgement of the heart, with often focal interstitial haemorrhages. The essential and most important lesion was hyaline degeneration or Zenker's necrosis of the cardiac muscle fibres. This was often so intense that the degenerated cells appeared as a homogeneous structureless mass devoid of nuclei and striations. In addition to causing damage to the heart, the toxin was found to contain specific nephrotoxic

properties. The severity of the lesions varied with the length of time the animals survived. The main changes were practically confined to the cortex of the kidney, and consisted of degeneration and sometimes necrosis of the tubules, with congestion of the glomeruli and often the formation of hyaline or fibrin thrombi. Lesions in the spleen and liver were not very severe, but in guineapigs haemorrhages and focal necrosis were frequent in the adrenal glands.

PRIGGE, R. (1936). Experimentelle Untersuchungen ueber die serologischen Eigenschaften des Fraenkelschen Gazbazillus (*B. perfringens*). [**Experimental Observations on the Serological Behaviour of** *Clostridium welchii*]. —*Z. ImmunForsch.* **89.** 477-488. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 308. Signed G. S. WILSON].

Studying two strains, Prg. 2L and Prg. 187, of *Cl. welchii* the author found a considerable discrepancy between the haemolytic dose and the 50 per cent. lethal dose for mice inoculated intravenously. With Prg. 2L the haemolytic dose was 1·7 times the 50 per cent. lethal dose, whereas with Prg. 187 it was 17 times this dose. From this it was concluded that, besides the so-called alpha toxin which is responsible for haemolysis, there is also a zeta toxin which is mainly responsible for the lethal action on the animal organism. Neutralization experiments confirmed this conclusion, indicating that the zeta toxin, predominant in Prg. 187, was of very much greater importance than the alpha toxin in determining the death of inoculated animals. From the practical point of view the author regards it as important that an antitoxic serum should contain a high content of zeta antitoxin. He further points out that the measurement of the zeta antitoxin can be carried out only with *welchii* filtrates that are poor in alpha toxin.

CABRET. (1936). Quelques considérations sur le tétanos du cheval. [**Tetanus in the Horse**].—*Rev. vét., Toulouse.* **88.** 556-564.

C. records the development of tetanus in an army horse which had received a dose of antitetanic serum on account of a wound. The injury was reported 17 hours after occurrence when thorough antiseptic treatment was applied and a full dose of potent antitetanic serum was administered. The following day the horse marched 32 miles to hospital and four days after admission tetanus appeared. C. discusses the probable causes of failure of serum therapy in this case, particularly the possibility of specific infection at a date previous to infliction of the wound mentioned, the significance of the 17 hours' delay before the injection of the serum and the effect of the long march on the immunization process.—C. DAVENPORT.

DISEASES CAUSED BY PROTOZOAN PARASITES.

HEGNER, R. (1937). **Parasite Reactions to Host Modifications.**—*J. Parasit.* **23.** 1-12. 1 table.

One method of determining the factors which restrict certain parasites to one or few hosts is to subject the hosts to changes of temperature, humidity, etc., and to study the reactions of introduced parasites. Increasing the sugar content of the blood favours the bird malaria parasite whereas reduction of the sugar content has a reverse effect. Increasing the temperature and relative humidity of the host's environment is also favourable to the parasite. H. and his co-workers confined their attention to those changes which might be expected to occur in nature as, for example, a change of diet. Intestinal protozoa are found principally in herbivorous animals and, with this in mind, feeding experiments were performed :

these showed that a carbohydrate diet rendered the intestinal contents of certain hosts more favourable than the normal for natural protozoan parasites. A diet rich in protein was correspondingly unfavourable. It appeared that differences in the H ion concentration were of small importance in producing these results which may be dependent upon bacteria associated with the diet or upon natural food factors.—C. HORTON-SMITH.

DŽUNKOVSKI, E. (1934). Parazitološke beleške. Popis zoo-parazita naših domaćih životinja. [**Parasites of Domestic Animals in Yugoslavia**].—*Glasn. hig. Zav.* **17.** 109-129. 20 figs., 3 plates. [German summary].

In addition to quite a number of common parasites of man and animals, D. observed some species in Yugoslavia which have not been previously described. He is of the opinion that in southern Serbia two types of *Piroplasma bigeminum* occur in cattle, *viz P. bigeminum* Smith and Kilborne and *P. bigeminum* var. *macedonica* var. nova Džunkovski [possibly *Babesiella major* n.sp. Donatien, 1932].

In the valley of the Danube the author discovered a new parasite in the red blood corpuscles of cattle, which consists of chromatin only, and he gives it the name *Pirochroma mayeri* Džunkovski n. gen. n. sp. In sheep he found an analogous parasite in southern Serbia and along the Adriatic coast; he calls this *Pirochroma inchiostri* n. gen. n. sp. In goats in south Serbia *Theileria hirci* Džunkovski and Urodžević was found. In the south he recorded *Leishmania tropica* in the dog. He found *Filaria immitis* in a dog at Belgrade. In poultry in southern Serbia he found *Treponema gallinarum* and Balfour's granules.

A list is given of all protozoa and helminths that were found. The original must be consulted for details.—B. OSWALD (SKOPLJE).

I. SCHILLING, C. (1936). Au sujet des modes divers de l'évolution trypanosomienne chez les glossines. [**Development of Trypanosomes in Glossina**]. —*Bull. Soc. Path. exot.* **29.** 817-820.

II. ROUBAUD, E. (1936). Au sujet des modes divers de l'évolution trypanosomienne chez les glossines. [**Development of Trypanosomes in Glossina**]. —*Ibid.* 820-821.

I. S. suggests that the stimulus required to provoke the development of trypanosomes in tsetse-fly is provided by the change of medium from blood to the serum-saliva mixture of the proboscis. Trypanosomes of the *vivax* group are unable to survive in the pharynx and, although they survive in the hypopharynx, they are not able to multiply. Owing to the entry of saliva into the proximal portion of the intestine, organisms of the *congolense* group are able to multiply in the intestine, but this intestinal development is aberrant and of no importance in the cyclical development of the parasite which is completed in the labial cavity. In the case of the polymorphic trypanosomes there is a more perfect adaptation to survival in pure saliva, and the organisms enter the salivary glands. S. supposes that in this case rare trypanosomes enter the hypopharynx and pass from there up the salivary duct to the gland. It is suggested that it is possibly only one of the forms of the polymorphic trypanosomes which is able to proceed to the salivary gland *via* the hypopharynx, and that the other forms proceed to the intestine, where they multiply but fail to complete their development. Old laboratory strains of polymorphic trypanosomes are able to multiply in the intestine, but have lost their adaptability to saliva. In other cases infection of the serum-saliva mixture may succeed but not infection of the intestine. Metacyclic forms are only encountered in a mixture of saliva and serum, or in pure saliva, and the occasional

occurrence of such forms in the pharynx and proventriculus may be due to the swallowing of saliva.

II. R. also considers that there is no foundation for the theory that the infection of the salivary glands results from the passage of trypanosomes from the intestine through the body cavity, and agrees that a primary infection of the hypopharynx may be the source of the invasion of the salivary glands.—U. F. R.

SLATINEANU, A., BALMUS, G., & BALMUS, P. (1936). Sur l'action pathogène du *Trypanosoma lewisi*. [**The Pathogenic Action of** *T.l.*].—*Bull. Soc. Path. exot.* **29.** 888-894.

The authors describe an outbreak of serious disease which occurred amongst their young experimental white rats, and appeared to be due to *Tryp. lewisi*. Wild rats, spermophiles and adult white rats also harboured the trypanosome but did not develop symptoms of disease. The disease was characterized by debility, loss of hair, conjunctivitis, a haemorrhagic lesion at the end of the nose and oedema of the feet. A detailed description is given of the pathological findings in six young white rats which died of the disease.—U. F. RICHARDSON.

GIRAUD, P., & CABASSU, H. (1936). Le diagnostic de la leishmaniose canine par la ponction ganglionnaire. [**Diagnosis of Canine Leishmaniasis by Lymph Node Puncture**].—*Bull. Soc. Path. exot.* **29.** 958-963.

G. and C. describe 15 suspected cases of canine leishmaniasis in which they applied the formol gel test and lymph node puncture for diagnosis, giving the technique for obtaining the lymph juice for microscopic examination. Examination of skin ulcers and the peptonate of iron test were each used twice. They found the gland puncture method to be as reliable as the formol gel test for diagnosis. Varying hypertrophy of the lymph nodes was noted in most positive cases. —C. V. WATKINS.

DONATIEN, A., & LESTOQUARD, F. (1937). Le parasitisme du poumon dans la leishmaniose générale du chien. [**Parasitism of the Lung in Generalized Leishmaniasis of the Dog**].—*Bull. Soc. Path. exot.* **30.** 28-31. [8 refs.]

A description of ten cases of canine leishmaniasis in which varying numbers of the parasites were found in the lungs by direct smear preparations. Some of these cases show that the whole reticulo-endothelial system may be parasitized, death occurring by blockage of the system and before the onset of anatomical lesions. The authors suggest that the number of the parasites may be in proportion to the age of the infection.—C. V. WATKINS.

ANDREWS, Mary N. (1935). **A Case of Canine Kala-Azar Occurring in China.**—*9th Congr. Far-East. Ass. trop. Med., 1934.* pp. 679-681. 2 figs. on 1 plate. [4 refs.] [In English].

A natural infection of kala-azar in a dog is described. There was gross hypertrophy of the lymph nodes suggestive of lymphosarcoma, an absence of skin lesions and no noticeable enlargement of the spleen. The disease was not diagnosed during life.—C. V. WATKINS.

YAKIMOFF, W. L., & GOUSSEFF, W. F. (1936). Zur Frage der Modifikation der Virulenz der Theileria annulata. [**Changes in the Virulence of** *Th.a.*].—*Z. InfektKr. Haustiere.* **50.** 65-70. [3 refs.]

Experimental passage of two strains of *Th.a.* by inoculation (subcut. or intraven.) of blood or lymphatic tissue is recorded. Eight sub-passages were carried out in one case, and four in the other. No reduction of virulence occurred.

Out of 24 animals under experiment, 22 died or were slaughtered *in extremis*, and two recovered under treatment with " todorit ". The incubation period of the disease as seen in Russia averaged 20·2 days, but in most cases febrile symptoms developed on the 19th or 20th day.

The disease is compared to that due to *Th. dispar*, in which the average incubation period is 16 to 17 days, and in which only 174 out of 493 experimental animals died, and to theileriasis of Turkestan in which the average incubation period is 16·6 days.—U. F. RICHARDSON.

I. YAKIMOFF, W. L. (1936). Le rapport du Piroplasma bigeminum et Françaiella colchica au Caucase. [**Relationship between *B.b.* and *Fr.c.* in the Caucasus**].—*Ann. Soc. belge Méd. trop.* **16.** 159-160. 1 table.

II. CORONEL, A. B. (1936). **Two Outbreaks of Texas Fever in Dairy Cattle.**—*Philipp. J. anim. Indust.* **3.** 343-346. 1 table.

I. In this abstract the author's nomenclature is used. He reports further work on this subject in the Caucasus and the neighbouring territories. He gives *B. b.*, *Fr. caucasia* and *Fr. colchica* as the usual causes of bovine haemoglobinuria. Contrary to the usual belief, routine blood examinations of animals during a severe epizootic revealed *Fr. colchica* to be ten times more numerous than *B. bigemina*.

II. A brief account of Texas fever in nine imported Holstein cows and two bulls. No curative drug was at first available. Trypan blue arrived later and was given, but only the bulls were saved.—R. FISHER.

REGENDANZ, P. (1936). Ueber den Entwicklungsgang von *Babesia bigemina* in der Zecke *Boophilus microplus*. [**Development of *B.b.* in *Boophilus microplus***].—*Zlb. Bakt. I. (Orig.).* **137.** 423-428. [5 refs.]

R. refers to his inability to detect developmental stages of *B.b.* in Hamburg in ticks of the species *Boophilus microplus* raised from females received from South America, and fed on infected calves.

In South America he was unable to infect calves with larval ticks raised from females fed on infected animals, and had to resort to blood inoculation. In hundreds of ticks – larvae, nymphs and ovigerous females – examined at various stages of development after feeding on infected animals, only very rare developmental forms of the parasite were discovered. The earliest stage of development was found in female ticks 24 hours after they had dropped from the host. This stage consisted of organisms from 3μ to 4μ in diameter with a large nucleus, composed of a central granule and a colourless halo, and it occurred in the epithelial cells lining the intestine. In older ticks these forms gave place to smaller forms from 2μ to 3μ in diameter, to worm-like forms and finally to rounded forms, 3μ in diameter, the latter being in the ovary. Sporonts and sporoblasts, as described by DENNIS, could not be detected, nor was any invasion of the salivary gland demonstrable.
—U. F. RICHARDSON.

DUPONT, O. (1936). Uma primeira observação dectericia hemorragica dos carneiros no Brasil. [**Icterohaemoglobinuria in Brazilian Sheep**].—*Campo, Rio de J.* **7.** No. 73. 31.

This disease was due to the feeding of sheep with residues from the manufacture of maize feeds and, some workers state, to ingestion of copper sulphate in vermifuges over a period. On changing the system of feeding, the disease disappeared. Duration of disease was from 2 to 3 days, culminating in death.

The symptoms were inappetence, depression, icterus, haemoglobinuria, and sometimes a bloody discharge from the nose. The temperature was sub-normal and death ensued.—W. L. MARSHALL.

Tyzzer, E. E. (1937). **A Discussion of Factors Influencing the Course of Coccidiosis.**—*J. Amer. vet. med. Ass.* **90.** 341-346. [3 refs.]

In contrast to severe types of fowl coccidiosis where extensive and obvious damage may be done to the intestine, there are other types produced by coccidiosis which do less apparent damage and have no immediate effect on the health of the bird although they may be present in large numbers. In examining the nature of chronic coccidiosis T. deals with possibilities of coccidium population continuance in the absence of reinfection. Where the number of surviving progeny is less than that of the parental generation the result is a declining population. Oocyst formation contributes nothing to the maintenance of population within the host, and if all individuals developed into oocysts *via* sex forms, the infection would terminate. The tendency towards sexual differentiation brings about self-limitation and there is no protective reaction of the host. The hypothesis that coccidium infections in chickens are self-limited in the absence of reinfection is perhaps open to question in certain cases. A fairly stable population may be maintained when the numbers of each generation of progeny capable of multiplication in the same host is more or less equal to the parent generation. Infections are probably not infrequently maintained at low levels over long periods. An increasing population, obtained by a consistent increase in the organisms through successive generations, results in high infections. Referring to the aetiology of chronic coccidiosis T. points out that no proof exists for any existing hypothesis. Mixed infections may delay immunity in the host, but this and the whole question of chronic coccidiosis requires further study. Flock treatment should be aimed at by the maintenance of nutrition by various measures.—C. Horton-Smith.

Michin, N. A., & Ažinov, S. A. (1935). Spirochaeta kak vozbuditel infekcionnej želtuchi i krasnoj moči teljat i vsroslovo rog. skota na sev. Kavkaze. [**Spirochaetal Jaundice of Cattle in North Caucasus**].—*Sovyet. Vet.* No. 10. pp. 23-27. 7 figs. [French summary].

Cultures were made from the heart blood of a calf which had died of icterohaemoglobinaemia on a collective farm in the north Caucasus region, and also from the liver and spleen. Microscopic examinations of the cultures were made daily, and on the eighth day spirochaetal forms were seen. G. pigs and white mice were inoculated with this culture and it was found to be pathogenic for them. From them cultures were made in which spirochaetes were found. These resembled the spirochaetes isolated from cases of Weil's disease in man. G. pigs and white mice died seven or eight days after inoculation.

M. and A. urge the importance of taking the temperature of suspected animals daily, and of using " salvarsan ", " albargin ", trypan blue, or " trypaflavine ", etc. at the first sign of fever. Later application is usually ineffective.

Hungerford, T. G. (1936). **Fowl Tick Fever (Spirochaetosis).**—*Agric. Gaz. N.S.W.* **47.** 349-351. 1 fig.

This is a good account of avian spirochaetosis intended primarily for the farmer.—W. I. B. Beveridge.

I. Bartl, P. J. (1936). Untersuchungen auf Leptospiren bei nicht an Stuttgarter Hundeseuche leidenden Hunden. [**Leptospira in Dogs not Affected with Stuttgart Disease**].—*Wien. tierärztl. Mschr.* **23.** 681.

II. Schmidt, H. (1936). Untersuchungen von Katzennieren auf Leptospiren. [**Examination of Cats' Kidneys for Leptospira**].—*Ibid.* 717.

I. Leptospira were not found in any of the kidneys of three healthy dogs or of 26 dogs affected with various diseases.

II. Parallel work gave negative results for 40 cats dead of various diseases. [The point of interest is the relation of spirochaetes to Stuttgart disease, *V. B.* **6.** 256].—J. E.

Carpano, M. (1936). Sur les microorganismes du type Rickettsia observés chez des Ixodes en Egypte. [**Rickettsia seen in Ticks in Egypt**].—*Ann. Parasit. hum. comp.* **14.** 417-422. 7 figs. on 1 plate. [1 ref.]

C. describes rickettsia-like bodies found in the digestive tracts of three ticks. In the first (*Hyalomma aegyptium* from a bull infected with *Theileria annulata*) the forms found resembled the shizogony stage of *Theileria*. In the second (*Rhipicephalus sanguineus* from a tigress harbouring *Tryp. sudanense* and in the blood of which anaplasmoid forms, thought to be stages in the life-cycle of these trypanosomes, were also present) rickettsia-like forms very similar to *Rickettsia prowazeki* and *R. avium* were found.

In the third (*Rhipicephalus simus*, examined from a group collected from several felines affected with *Babesia felis* at a zoo) forms resembling known stages of babesiella were found.

C. discusses the relationship of these rickettsia-like forms in blood-sucking insects to pathogenic agents in domestic animals and man, and classifies them as in the group *Rickettsia-Grahamella-Theileria*.—C. V. Watkins.

DISEASES CAUSED BY VIRUSES.

Pyl, G., & Klenk, L. (1936). Die Haltbarkeit des Virus der Maul- und Klauenseuche in hochprozentigen Salzlösungen. [**Viability of Foot and Mouth Virus in Strong Salt Solutions**].—*Zlb. Bakt. I.* (*Orig.*). **137.** 433-437. 2 figs., 1 table. [10 refs.]

High concentrations of sodium chloride (up to 28%) are more favourable than low concentrations for the prolongation of viability of the virus of F. & M. This effect is very much more marked if albumin is present in the solution. Other salts of the alkaline-earth metals proved valueless for preservative purposes. Saline preservation is valuable when the use of glycerin is contra-indicated.—E. J. P.

I. Schmit-Jensen, H. O., Schmidt, S., & Hansen, A. (1936). Om aktiv immunisering af marsvin mod mund- og klovesyge med højvirulent virus, adsorberet til aluminiumhydroksyd. [**Immunization of Guinea Pigs against Foot and Mouth Disease by Virus Adsorbed in Aluminium Hydroxide**].—*Maanedsskr. Dyrlaeg.* **48.** 1-18. 1 table. [13 refs.] [German summary]. [Also appeared in *Rev. Immunol.* **2.** 359].

II. Schmidt, S., & Hansen, A. (1936). Adsorption fa mund- og klovesygevirus paa aluminiumhydroksyd. Patogenitet og immuniserende egenskaber hos forskellige virus-aluminiumhydroksydabsorbater. [**Adsorption of Foot and Mouth Disease Virus by Aluminium Hydroxide**].—*Ibid.* 45-57. 5 tables. [5 refs.] [German summary].

I. A highly virulent virus from primary lesions in g. pigs was adsorbed of $Al_2(OH)_6$ after freeing the lymph from fibrin and cells. Two concentrations on the adsorbed virus were made and were respectively called "1% and 2% vaccine".

After inoculation (subcut.) with these vaccines, g. pigs developed active immunity without generalization of the disease. Only a local infiltration caused

by the injected $Al_2(OH)_6$ was found. Intradermal and intraperitoneal inoculation with the same " vaccine " always produced generalization. Thirty-seven animals were vaccinated twice with an interval of 14 to 16 days between the vaccinations. The test for immunity was made 26 days after the last inoculation. Seventeen animals showed total immunity and 20 partial immunity (*i.e.*, abortive primary lesions were found, but no sign of generalization). The primary lesions healed up after five to six days and the animals could be regarded as almost completely immune. A single injection of vaccine gave a similar but somewhat slighter effect. The vaccine could be stored for many weeks at 0°C. without decreasing the titre of the virus. After drying the vaccine on hay, the virus was still virulent after four hours, but it was destroyed after 24 and 48 hours. This is thought to be due to the dried $Al_2(OH)_6$.

II. This experiment was made in connexion with the above. It was found that virus treated with formol produces a considerably lower immunity in g. pigs than virus adsorbed in $Al_2(OH)_6$. To render the virus non-pathogenic the mixture must contain a fairly large amount (80%) of an $Al_2(OH)_6$ suspension which contains 2% of Al_2O_3. Viruses from cultures and from lesions for the most part behave similarly when treated with $Al_2(OH)_6$. Vaccination with the virus – $Al_2(OH)_6$ complex gives a relatively strong immunity of long duration. It is possible to immunize g. pigs against types " O ", " A " and " C " with a trivalent vaccine. The method found to be best was a combination of treatment with formol-vaccine and with virus-$Al_2(OH)_6$ complex – one injection of the former and afterwards one or two injections of the latter.—H. C. Bendixen (Copenhagen).

I. Schmidt, S. (1936). Sur l'effet immunisant d'un adsorbat, virus aphteux-hydroxyde d'aluminium inactivé par la chaleur comparé à celui d'un adsorbat renfermant du virus non atténué. [**Immunization against Foot and Mouth Disease**].—*Rev. Immunol.* **2.** 580-582. 1 table. [1 ref.]

II. Schmidt, S. (1936). Sur la vitesse d'apparition et la durée de l'immunité antiaphteuse du cobaye immunisé par une seule injection de virus aphteux adsorbé par l'hydroxyde d'aluminium. [**Immunity to Foot and Mouth Disease**].—*C. R. Soc. Biol. Paris.* **123.** 193-196. [2 refs.]

III. Oerskov, J., Hansen, A., & Schmidt, S. (1936). Recherches sur le mécanisme de l'infection aphteuse chez le cobaye. [**Mechanism of Foot and Mouth Disease Infection in the Guinea Pig**].—*Rev. Immunol.* **2.** 583-586. 1 table. [2 refs.]

I. A vaccine was prepared by the adsorption of virus with aluminium hydroxide, and this was incubated at 37°C. for two days (inactivated). Another vaccine was prepared, similar except that it was not incubated. Comparison by g. pig inoculation of incubated and unincubated vaccines showed that the former was more suitable as a vaccine. It was not as potent as the unincubated vaccine ; the duration of immunity, however, was found to be as long as 90 days.

II. An immunity to infection is rapidly developed in the g. pig after a single injection of a vaccine prepared by adsorption of virus with aluminium hydroxide. This immunity lasts up to five months and closely resembles that acquired after infection of g. pigs by intradermal inoculation. Immunity to intradermal inoculation was found to be present from the second day after vaccination. Some of the g. pigs showed slight clinical lesions after the subcut. inoculation of the vaccine.

III. By the inoculation of a series of g. pigs and the determination of the presence of virus in the tissues by further g. pig inoculation, it was found that at no time was the concentration of virus in the liver and spleen greater than that of the blood. In fowl plague these tissues were found to be more virulent than the

blood at a certain stage. It is suggested that the spleen and liver may be capable of neutralizing F. & M. virus *in vivo*.—E. C. Hulse.

Oliver, A. (1936). **A Note on the Control of Rinderpest in India.**—*Agric. Live-Stk India.* **6.** 626-631.

O. states that inoculation by the serum-alone method as a field measure is useless, that the serum and virus method is excellent but expensive, and that the goat-virus-alone method is as effective as the serum and virus and is cheaper. The use of a fixed goat virus, the virulence of which is high for goats but low for oxen, is advocated, since 450,000 cattle in Bengal were successfully immunized with goat-tissue virus with a low rate of mortality. Goat-blood virus gives a more severe reaction than goat tissue virus in buffaloes. Tissue virus can be kept in cold storage for 28 days and the immunity conferred is of about three years' duration. No undesirable sequelae accompany immunization and O. believes that, given the necessary staff, the disease could be eliminated cheaply by the use of tissue-goat virus.—R. L. L. Hart.

D'Costa, R. S. J. (1936). **Rinderpest – Its Differential Diagnosis and Treatment.**—*Indian vet. J.* **13.** 120-124.

The clinical differences between rinderpest, foot and mouth disease, malignant bovine catarrh, stomatitis simplex, coccidiosis and piroplasmosis are described, and general notes given on the treatment and control of rinderpest.—R. L. L. Hart.

Jacotot, H. (1936). Pouvoir immunigène de la lymphe jennérienne récoltée sur des animaux atteints de peste bovine. [**Immunizing Power of Vaccinia Lymph from Animals Affected with Rinderpest**].—*Bull. Soc. Path. exot.* **29.** 828-832.

J. has previously reported that a simultaneous infection with vaccinia and rinderpest may be established in calves [*V. B.* **7.** 174]. He now shows that the pustular exudate obtained in such cases of dual infection possesses strong anti-rinderpest immunological properties.—C. Davenport.

Crawford, A. B. (1937). **Experimental Vesicular Exanthema of Swine.**—*J. Amer. vet. med. Ass.* **90.** 380-395. 2 figs., 3 tables. [4 refs.]

Porcine vesicular exanthema is known only in California. The disease closely resembles foot and mouth disease in its clinical appearance. Strains from four different sources have been studied, and each strain of virus appears to be an immunologically distinct type. Cross-immunity tests on swine show that an immunity may be produced to a homologous type, but that no cross-immunity exists between the four types.

The disease is similar to vesicular stomatitis in that it is not readily spread by indirect infection. Unlike F. & M., vesicular exanthema is not extremely infectious.

Swine recovered from the two types of vesicular stomatitis (Indiana and New Jersey) show a partial immunity to porcine vesicular exanthema. Recovery from F. & M. confers no such immunity. Pigs recovered from vesicular exanthema are susceptible to infection with both the above viruses.

Of the four strains of virus examined, two produced lesions in swine only, and the other strains gave rise to a thermal reaction and mild lesions in horses as well as swine. Cattle, sheep, goats, g. pigs, and hedgehogs are insusceptible to inoculation with the virus. After inoculation of swine by scarification of the snout and interdigital spaces, there is a rise of temperature in 24 hours and vesication occurs at the site of inoculation. In severe cases vesicles may appear on the tongue.

Regeneration of the epithelium takes place rapidly, and the health of the animal is not impaired.—E. C. Hulse.

I. Inántsy, E. (1936). Adatok z szopós malacok sertéspestis elleni szimultánojtásához. [**Simultaneous Inoculation of Sucking Pigs against Swine Fever**].—*Állatorv. Közl.* **33.** 126.

II. Hegyeli, Z. (1936). Szopismalacok sertéspestis elleni szimultán ojtása mint kisérleti praeventio a választási malacok tömeges elhullása ellen. [**Simultaneous Inoculation of Sucking Pigs against Swine Fever**].—*Állatorv. Lapok.* **59.** 241-244. 1 table.

III. Binder, H. (1936). Adat a sertéspestis elleni szimultánojtással nyert immunitásnak idótartamához. [**Duration of Immunity obtained by Simultaneous Inoculation against Swine Fever**].—*Ibid.* 282-283.

IV. Hegyeli, Z. (1936). Szervek rothadása, mint a sertéspestisvirus kimutatását gátló folyamat. [**Diagnosis of Swine Fever from Decomposed Carcasses**].—*Ibid.* 327-328. [2 refs.]

I. Sucking pigs given serum plus virus and later virus alone acquire immunity which sometimes lasts no more than five months. Swine fever of a mild type has been observed in such pigs at the sixth month.

II. H. suggests that young pigs may be strongly immunized against S.F. by giving them three successive inoculations of (1) serum plus virus, (2) virus, and (3) serum plus virus, at intervals of 10 and 20 days respectively, the first injection being made at six to eight weeks of age. This method is only safe in cases where the sows have been previously immunized.

III. Through long experience B. concludes that an immunity of three years' duration is obtainable by serum plus virus, followed by virus alone.

IV. With regard to the biological diagnosis the author states that the virus may be destroyed by decomposition in spleen kept for as little as 60 hours. It is very important to use fresh material.—Z. de Czukas (Magyaróvár).

I. Remlinger, P., & Bailly, J. (1936). Transmission du virus de l'encéphalomyélite des equidés à la cigogne. [**Transmission of the Virus of Equine Encephalomyelitis to the Stork**].—*C. R. Soc. Biol. Paris.* **122.** 518-519. [1 ref.]

II. Remlinger, P., & Bailly, J. (1936). Observations sur les cigognes marocaines. [**Notes on Moroccan Storks (including Diseases)**].—*Maroc méd.* **16.** 600-611. 10 figs. [1 ref.]

I. A record of two original experiments in which the virus of equine encephalomyelitis was inoculated into the stork. Two strains of virus were employed, namely, the Argentine and the eastern variety of the North American strain. Inoculation was by the cerebral route. In both cases the inoculated birds died. The virus was recovered from them by g. pig inoculation.

II. This is a natural history study. It includes, however, a few brief notes on certain avian diseases which have been observed in storks in Morocco, notably fowl pox, also bacillary enteritis, pasteurellosis, spirochaetosis and fowl plague. Experimental storks have been infected with rabies and equine encephalomyelitis.—C. Davenport.

Kelser, R. A. (1937). **Equine Encephalomyelitis in Panama.**—*Vet. Bull. U. S. Army.* **31.** 19-21. [2 refs.]

K. confirmed the presence of eq. enceph. for the first time in Panama. Serum protection tests on g. pigs inoculated with local horse virus showed that it was the eastern type of virus that was present.—J. E.

Vertinskij, K., Bol, G., & Bransburg, A. (1935). Diagnostičeskoe značenie vključenij v nervnich kletkach mozga pri epizooticèskom encefalomielite lošadej SSSR. [**The Diagnostic Significance of Inclusions in the Nerve Cells of the Brain in Equine Encephalomyelitis**].—*Bull. Moscow vet. Inst.* **2.** 39-66. 20 figs., 1 table. [19 refs.] [German summary].

The authors made histological studies of the brains (especially Ammon's horn and cortex), of 400 animals affected either naturally or experimentally with eq. enceph. They describe the appearance and location of acidophile inclusions which they found in the nerve cells, and consider them to be specific for the disease. They do not believe that inclusions are parasitic in origin, as they observed their transformation from oxyphile particles of protoplasm and indefinite forms into the inclusion bodies described.

Bosnić, L. (1936). Zarazna anemija konja. (Anaemia infectiosa equorum). [**Equine Infectious Anaemia in Yugoslavia**].—*Vet. Arhiv.* **6.** 417-527. 2 graphs, 1 map. [Numerous refs.] [German summary].

A few observations concerning an outbreak of E. I. A. in Yugoslavia. The results do not differ from those obtained by earlier workers.—B. O. (Skoplje).

Hirt, G. (1936). Histologische Veränderungen des Zentralnervensystems bei der Aujeszkyschen Krankheit. [**Histological Changes in the Central Nervous System in Aujeszky's Disease**].—*Arch. wiss. prakt. Tierheilk.* **70.** 323-339. 4 figs., 1 table. [Numerous refs.]

H. examined histologically the brain and, in some cases, the spinal cord, of 53 pigs and piglets, and eight sheep. These included animals naturally and artificially infected with Aujeszky's disease and also normal pigs, as well as some affected with swine fever.

In pigs and piglets the virus produced an acute non-purulent meningo-encephalitis with perivascular infiltration of lymphocytes and histiocytes. No cell inclusions could be demonstrated. Neuronophagia was marked. The histological changes in piglets showed slight variations from those seen in adults – marked glial proliferation in the ventral horn of the grey matter of the cord, more pronounced neuronophagia, and brain changes which were most marked in the nervous tissue in the region of the ventricles.

In naturally infected pigs the nervous lesions were found within two to six days of the appearance of clinical symptoms; in piglets they were demonstrable within one to three days of the first symptoms.

Similar nervous lesions were not present in healthy pigs nor in animals immunized against swine fever. The findings in five pigs artificially infected with swine fever virus were inconclusive but other workers who have dealt with this question have not found very pronounced lesions of this type 9-11 days after infection.

It is considered that the presence in pigs and piglets of the lesions described affords evidence of Aujeszky's disease.

In two naturally infected sheep perivascular round-cell infiltration occurred, but this was absent in six artificially infected animals.—E. G. White.

I. Millischer, P., & Marteau, P. (1936). Observations sur la congélation des moelles rabiques. [**Effect of Freezing on Spinal Cords of Rabid Animals**].—*C. R. Soc. Biol. Paris.* **122.** 727-728. [5 refs.]

II. Remlinger, P., & Bailly, J. (1936). Association de la spiroptérose canine et de la rage. [**Co-Existence of Canine Spiroptera Infestation**

and Rabies].—*Maroc méd.* **16.** 497-499. [5 refs.] [Also appeared in *Bull. Acad. vét. Fr.* **9.** 310-314].

III. Millischer, P., & Millischer, A. (1936). Expertise du virus rabique fixe utilisé à Beyrouth. [**Examination of Fixed Rabies Virus Used at Beirut**].—*Bull. Soc. Path. exot.* **29.** 626-632. [4 refs.]

IV & V. Yen, A. C. H. (1936). **Experimental Virus Infections in Chinese Hamster. I. Susceptibility to Fixed Rabies Virus. II. Susceptibility to Street Rabies Virus.**—*Proc. Soc. exp. Biol., N.Y.* **34.** 315-318 and 648-657. 2 tables. [3 refs.]

I. While rabid brains have been shown to survive 25 months when frozen, or longer in glycerin at +6°C., the survival period of spinal cords similarly treated is of much shorter duration. Lépine has shown fresh cords to survive only 70 days at −10°C. or 14 to 30 days in glycerin at +3°C., and the authors here report on desiccated cords, which proved viable for 85 days at −7°C. after two days' drying, or 20 days at −7°C. after 3 days' drying, and 7 days in glycerin at +3°C., after three days' drying. It is important also to note that 50% of the experimental animals showed symptoms of excitation never observed with the normal passage virus. Prolonged freezing as a method of preservation is, therefore, of uncertain value for rabies vaccine work.

II. It would appear that the spiroptera infestation in the dog may mask the symptomatology of rabies, should infection with the latter disease occur. A case is described in which a dog, after suffering from violent attacks of vomiting, died in 36 hours, without showing any evidence of rabies. At *post-mortem* examination the only lesion found was a parasitic growth in the oesophagus, containing spiroptera. A g. pig inoculated under the dura mater with brain emulsion died without symptoms in six days, and rabbit inoculations with material from this g. pig unquestionably confirmed rabies ; it proved to be a virus of exalted virulence, killing rabbits in 10 to 11 days. It is, therefore, evident that rabies cannot be excluded when spiroptera infestation is present, nor are the characteristic lesions always to be expected in the gastro-intestinal form of rabies.

III. Following the recently advocated principle of periodic examination of the fixed virus, the authors here report the behaviour of the strain they use at Beirut, obtained from Remlinger and Bailly at Tangiers about a year ago. Since its receipt it has had 19 rabbit passages, and the present symptomatology, the effect of desiccation, of glycerin, of ether, and of dilution, the pathogenicity for the anterior chamber of the eye and the protective value were examined. Remlinger and Bailly find that, with passage, fixed virus becomes less resistant to desiccation and glycerin, and more resistant to ether and dilution. The authors, however, find the virus more resistant to desiccation, and that it behaves irregularly with dilution, compared to the results obtained with the same virus by Remlinger and Bailly before its despatch. Whether this is due to climatic conditions, to the type of experimental rabbit used, or to other factors, is not clear.

IV. The effect of fixed rabies virus on Chinese hamsters, when inoculated by the intracerebal, intraperitoneal, subcutaneous, intramuscular and intratesticular route is described. Only the intracerebral route proved certain to infect, and a 10^5 dilution of virus was 100% effective. The symptomatology was usually of the paralytic type, but in some cases excitement was pronounced. Negri bodies could easily be demonstrated in Ammon's horn. Up to the present, hamster passage has not affected the pathogenicity of the virus.

V. Y. describes the pathogenic effects of inoculating street rabies virus into Chinese hamsters. Intracerebral inoculation proved very effective, 100% positive results being obtained with virus diluted 1×10^4 ; Negri bodies were regularly

found. Hamster passage virus, though still viable, was greatly reduced in virulence, only three hamsters out of ten being infected with a 4×10^2 dilution.—N. Hole.

Mackenzie, R. D., Findlay, G. M., & Stern, R. O. (1936). **Studies on Neurotropic Rift Valley Fever Virus. The Susceptibility of Rodents.**—*Brit. J. exp. Path.* **17.** 352-361. 8 figs. on 2 plates, 3 tables. [12 refs.]

The authors detail a method of fixing a neurotropic strain of Rift Valley fever virus in mice [neither of two strains produced were quite stable and each regained some viscerotropic properties when passaged in the brains of non-immune mice]. Mice with brain injuries were more susceptible to cerebral localization of this virus, as also were young mice, as compared with older ones. Nasal instillation of the virus produced encephalitis in mice. Rats and field voles died of encephalitis after intracerebral inoculation, but rabbits and g. pigs were immune. The histology of the lesions produced in rodents is detailed.—C. V. Watkins.

Donatien, A., & Lestoquard, F. (1936). Le virus claveleux. [**Sheep Pox Virus**].—*3rd Int. Congr. comp. Path., 1936.* **1.** Pt. 1. Vet. Sect. pp. 155-181. [Numerous refs.] [In French]. [Also appeared in *Rev. Microbiol., Paris.* **2.** 306-325].

Various discrepancies in the results of different workers on sheep-pox virus are explained by D. and L. as due to a difference in the susceptibility of individual sheep, and, more important, to variation in the virulence of virus used. The virus, whose specificity has been shown experimentally, is dermotropic, and found in greatest concentration in the skin lesions. Large amounts may be obtained by the subcut. inoculation of a sheep with a very small quantity of virus, and may be purified by heating to 52° to 53°C. for ten minutes, and by filtration. Different strains of virus maintained in the laboratory by passage through sheep have not a fixed virulence. Each strain would appear to have a definite individuality of its own, with three distinct periods, (1) that of extreme virulence, (2) that of lowered virulence, and (3) the period of declining virulence. In nature, sheep only are affected with the disease, but the horse, goat, rabbit, mouflon and gazelle can be infected experimentally. The virus would appear to have some relationship with Bridré's vaccine virus, and with the virus of goat pox.—A. Wilson Taylor.

Srikantaiah, G. N. (1936). **Variola in Domestic Animals with a special reference to Sheep-Pox.**—*Indian vet. J.* **12.** 315-323. 9 figs. on 4 plates, 3 tables. [13 refs.]

According to S., heavy losses occur annually and whereas the pox of man is interrelated with that of bovines, those of sheep and of goats are specific to their species, and vaccine for sheep pox can only be prepared from sheep.

Sheep pox is not normally transmissible to goats but, if so transmitted, further passage in goats is obtainable. The experiments showed that virus was viable seven months after its collection and storage.—R. L. L. Hart.

Kuppuswamy, A. R. (1936). **Caprine Variola in Province Wellesley, Varus (a Blotch on the Face).**—*Indian vet. J.* **13.** 130-138. 13 figs. on 8 plates, 1 table. [3 refs.]

This disease, introduced by two infected kids from a neighbouring estate, was recorded for the first time and resulted in a mortality of 54% of the goats infected, the high percentage being attributed to unfavourable climatic conditions, lack of hygiene and unsuitable food. The symptoms consisted of general disturbances, sneezing, coughing, conjunctivitis, rhinitis and high temperature followed by

erythema in the skin, developing into vesicles and pustules. The disease did not spread rapidly through a flock and those animals that survived an attack recovered very slowly in between 3 and 8 weeks.

No constant feature was found at *post-mortem* examination except a repulsive odour at evisceration.—R. L. L. Hart.

Torres, S. (1936). Transmissão da myxomatose dos coelhos pelo " Culex quinquefaciatus " conservação do virus no laboratorio. [**Transmission of Rabbit Myxomatosis by** *C.q.*].—*Bol. Soc. brasil. Med. vet.* **6.** 4-6.

C.q. when feeding transmits myxomatosis from rabbit to rabbit. Ears of diseased rabbits kept in a refrigerator at +5° to +10°C. wrapped in newspaper were still virulent after 18 months.

Tassinari, G. (1936). Le bactériophage dans les selles des animaux. [**Bacteriophages in the Faeces of Animals**].—*Boll. Sez. ital. Soc. int. Microbiol.* **8.** 159-161. [1 ref.] [In French].

Bact. coli bacteriophage was present in two out of 12 samples of faeces from different carnivorous animals at the Nervi Zoo, Genoa. Bacteriophage was present in the faeces of the " ginette " against *Bact. coli* isolated from the otter, and in jackal faeces against *Bact. coli* isolated from the condor. Both phages were tested against all the other animal strains and human strains of *Bact. coli*, but with negative results. [This finding is in disagreement with the results obtained by Lipska – (1933). *C. R. Soc. Biol. Paris.* **112.** 1463 –, who found that the bacteriophages with which she dealt were polyvalent]. The article should be consulted for a good description of the phage reaction and colony types in various media. —C. V. Watkins.

Bijl, J. P., & van der Schaaf, A. T. (1936). Over de inactiveerende werking van een ontstekingsinfiltraat op virussoorten. [**Inactivating Effect of Artificial Subcutaneous Infiltration on Viruses – a New Method of Immunization**].—*Tijdschr. Diergeneesk.* **63.** 1031-1037. [English, French and German summaries].

Various experiments were made by injections of the virus of dog distemper into an area of artificial subcutaneous oedema caused by the injection of 0·5 c.c. of turpentine. Control animals injected with virus without the turpentine injection became seriously ill, while injection of virus into an artificial subcutaneous oedema caused a less serious infection, and the animals of the latter series became immune to dog distemper. Injection of the virus of foot and mouth disease into similarly produced local oedema in a heifer caused neither disease nor immunity. Injection of fowl plague virus in the same circumstances into fowls caused no disease and no immunity. It seems that the virus may be made ineffective in an infiltration. —M. J. J. Houthuis (Rotterdam).

Lépine, P. (1936). Sur la congélation employée comme procédé pratique de conservation des virus. [**Preservation of Viruses in the Frozen State**].—*C. R. Soc. Biol. Paris.* **122.** 262-263. [3 refs.]

L. suggests that failure to obtain a satisfactory conservation of viruses in the frozen state has been due to inattention to two important factors, *viz* (a) ensuring a complete absence of air, and (b) avoiding of any form of dehydration. The latter can be effected by covering very thin pieces of tissue with a small amount of normal saline solution prior to freezing.—R. E. Glover.

PARASITES IN RELATION TO DISEASE (GENERAL).

I. VAN VOLKENBERG, H. L. (1936). **Parasites and Parasitic Diseases of Swine in Puerto Rico.**—*Bull. P.R.* [*fed.*] *agric. Exp. Sta.* No. 38. pp. 14. 2 figs. [3 refs.]

II. HALL, M. C. (1936). **Report on Parasites of Domesticated Animals and Man in Hawaii.**—*Washington, D.C. : U.S. Dep. Agric. Bur. Anim. Indust.* pp. 9. [Mimeographed].

I. The first part is concerned with consideration of general matters relating to parasites. Then certain particular parasites are dealt with in some detail, including *Metastrongylus elongatus* and *Choerostrongylus pudendotectus*, *Stephanurus dentatus*, *Globocephalus urosublatus*, *Macrocanthorynchus hirudinaceus* and *Cysticercus cellulosae*. The round worm is mentioned with others under the heading of " other internal parasites ". Mention is also made of damage done by external parasites, including demodectic mange.

II. This report is based upon observations and inquiries made during a month's stay in the islands. General factors having an influence on parasites are discussed and mention is made of specific conditions of parasitism seen or reported. Among other points noted are that the ox warble fly adult is not limited to a particular season, but is active at all times, and that there were a number of records of *Fasciola hepatica* in man. The eating of watercress from streams polluted with cattle manure is given as the explanation of these cases.—W. J. IRONSIDE.

PARASITES IN RELATION TO DISEASE (ARTHROPODS).

REGENDANZ, P., & MUNIZ, J. (1936). O Rhipicephalus sanguineus como transmissor da Piroplasmose canina no Brasil. [*R.s.* **as Transmitter of Canine Piroplasmosis in Brazil**].—*Mem. Inst. Osw. Cruz.* **31.** 81-84. [8 refs.]

It is abundantly proved, by the finding of *R. s.* on dogs and the demonstration in from 7 to 12 days of forms of *Babesia canis* in their blood, that *R. s.* is a host of *B. canis* in Rio de Janeiro. However, it is not possible to exclude the possibility that other ixodids are also capable of transmitting C. P. The species of *Babesia* recognized in Brazil is *B. major*, which causes the more benign form of the disease but further investigation is necessary to prove that *B. canis* or another form do not also exist there, being transmitted by *Dermacentor reticulatus*.—W. L. MARSHALL.

DOVE, W. E. (1937). **Myiasis of Man.**—*J. econ. Ent.* **30.** 29-39. [17 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 439. Signed P. A. BUXTON].

The paper is a useful summary of recent advances in knowledge about myiasis of man in the U.S.A. Its scope is less extensive than its title.

Among many other things the author records several cases of " creeping disease " due to the presence of Oestrid larvae beneath the skin. It is pointed out that infestations by *Gasterophilus* and *Hypoderma* are different in appearance and in symptoms. Now that attention has been called to the matter, it is evident that screw worm (*Cochliomyia hominivorax*, or *americana*) infestations of man are quite common in the southern States of the U.S.A. Fifty-five cases were reported in 1935 and details of many of them are given in the present paper. The author holds the view that the control of infestations of livestock has already resulted in a reduction in the number of cases in man, basing this on the fact that in 1935 there were 55 human cases and in 1936 8 reported.

Seguy, E. (1937). Opthalmomyiases provoqués par les mouches. **[Myiasis of the Eyes].**—*Ann. Hyg. publ. Paris.* **15.** 109-120. [Numerous refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 439. Signed Harold Grimsdale].

Ophthalmomyiases, affections of the eye caused by the larvae of flies, are rare in most countries. They are for the most part set up by flies who are usually parasitic on animals and have accidentally infected man. The most common, *Oestrus ovis*, is either oviparous or viviparous; a large number of larvae are deposited in a moment; the history in man is that the eye was struck by a fly and that an immediate irritation followed setting up a resistant conjunctivitis. Examination will show the presence of small active larvae in the conjunctival sac; since man is not the proper host, the larvae often do not develop, and may die, allowing a spontaneous cure. The attacks are seasonal, occurring when the fly is most common; in Europe in late summer or autumn; in north-Africa in late spring.

Another animal parasite occasionally attacking man is *Rhinoestrus purpureus*. This is specially a parasite of horses and is viviparous; as many as 40 larvae may be deposited at one effort; the disease is more serious than that caused by *O. ovis*; the larvae cause ulceration of the conjunctiva, and possibly loss of the eye.

Certain flies of the class Sarcophagi may attack the eye; this is very exceptional but needs urgent surgical attention. Other flies, *e.g.* gnats, may cause conjunctivitis, but this is slight only.

Mackerras, I. M. (1936). **The Sheep Blowfly Problem in Australia. Results of Some Recent Investigations.**—*Pamphl. Coun. sci. industr. Res. Aust.* No. 66. pp. 39. 2 tables. [Numerous refs.]

This paper describes briefly research into blowfly strike done by the Council for Scientific and Industrial Research since the publication of the First Report of the Joint Blowfly Committee in 1933.

Lucilia cuprina is the initial cause of strike in over 80% of cases examined, *Calliphora* spp. being responsible for initiating most of the rest. *L.c.* now occurs in all the sheep country of Australia, having recently invaded the outlying areas in the Gulf District of Queensland, and north-western Australia, where only a few years ago serious blowfly strike was unknown. Probably the introduction and spread of *L.c.* in Australia coincided with the first appearance and extension of strike. The seasonal incidence and geographic distribution of the different blowflies are described.

Flies are attracted to susceptible sheep principally by odour, and endeavours are being made to determine the actual attractive compounds by chemical fractionation. Contrary to popular belief, if a female fly is unable to find a suitable place to lay her eggs, she retains them and they slowly degenerate. The chief stimulus to oviposition is the odour.

As many as 1,700 adult *L.c.* have been bred from a natural strike, whereas the number of *Lucilia* which emerge from the carcass of a dead sheep is always less than 100. Hence it is futile to destroy carrion while making no efforts to destroy the maggots removed from strikes. Maggots from a strike are able to mature if removed when only two days old.

Two sets of factors operate in rendering a sheep liable to strike; the first is that which predisposes the sheep to strike without actually rendering it susceptible – skin wrinklings, and the second are those which render the sheep actually susceptible – weather and moisture of fleece.

As regards measures for reducing the abundance of flies, biological control is not considered hopeful, destruction of carrion presents practical difficulties but is

useful, while the trapping and poisoning of adult flies has been shown to be definitely beneficial in reducing strike incidence. As regards the protection of the sheep, selective breeding for plain breech conformation has an undoubted sphere of usefulness, and the Mules operation for the removal of breech folds has certain advantages.—W. I. B. Beveridge.

PARASITES IN RELATION TO DISEASE (HELMINTHS).

Paredes, A. (1936). Nota sobre algunos helmintos parásitos de los équidos. [**Some Parasitic Worms of Equines**].—*Trab. Inst. Biol. anim. Madr.* **4.** 122-127. 3 figs. [9 refs.]

Post-mortem examinations were carried out on six donkeys from Madrid and one mule from Toledo ; three of the donkeys were found to be free from intestinal parasites. The following parasites were found :- *Habronema muscae*, *H. microstoma*, *Setaria equina*, and *Strongylus vulgaris*. P. states that these parasites have not been previously reported as being found in Spain, in the literature he consulted. —A. H. Hunter.

Jerstad, A. C. (1936). **The Gizzard Worm, Amidostomum anseris, of Geese in Western Washington. Reports of Cases.**—*J. Amer. vet. med. Ass.* **89.** 318-320. [1 ref.]

Five cases, all from one farm, are reported. In four of these the diagnosis was made *post mortem* and in the fifth during life. In this bird, treatment with carbon tetrachloride was carried out and at subsequent *post-mortem* examination no parasites were found.—W. J. Ironside.

Hermansson, K. A. (1936). Bidrag till kännedomen om dynthuvudet till Taenia echinococcus. [**The Scolex of** *T.e.*].—*Skand. VetTidskr.* **26.** 62-67. 6 figs. [English summary].

A short description of the scolex of *Cysticercus echinococcus*, including some good illustrations to demonstrate the salient features.—H. B. (Stockholm).

Walker, A. E. (1936). *Cysticercosis cellulosae* **in the Monkey.**—*J. comp. Path.* **49.** 141-145. 4 figs. [4 refs.]

Outstanding features in the case reported are that the cysts were widely distributed and that their presence had not given rise to any visible local inflammatory reaction. They were present in practically every muscle in the body and also in the brain, liver, spleen, kidneys, lungs and heart.

They were identified as the larvae of *Taenia solium* by microscopic examination of sections. No adult worms were found in the affected animal.—W. J. Ironside.

IMMUNITY.

Guilherme Lacorte, J. (1937). A sôro-aglutinacão no diagnostico das bruceloses. [**Serum Agglutination in the Diagnosis of Brucella Infections**].—*Hosp., Rio de J.* **11.** 205-209. [10 refs.] [English summary]. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 461. Signed G. S. Wilson].

The author has examined 2,331 samples of human serum collected from various parts of Brazil for the presence of agglutinins to *Br. melitensis*, *Br. abortus*, and *Br. suis*. The suspensions were prepared from 48-hour liver agar cultures at

37°C., and the organisms are said to have been killed with 5 per cent. formol. In the test itself the tubes were incubated for 3-4 hours at 55°C., and left in the ice-chest overnight. Only five of the sera reacted to as high a titre as 1/50; of these, four agglutinated *Br. melitensis* only, and one agglutinated all three suspensions. The author concludes that Brucella infection in man must have been introduced quite recently into Brazil, and that it is at present sparsely distributed. [These figures support the conclusion that normal agglutinins to Brucella in a non-infected population are rarely found in a titre as high as 1/50.]

Landsteiner, K., & Jacobs, J. (1935). **Studies on the Sensitization of Animals with Simple Chemical Compounds. I, II and III.**—*J. exp. Med.* **61.** 643-656, **64.** 625-639 and 717-721. 2 figs. on 1 plate, 16 tables. [Num. refs.]

Experiments on the sensitization of g. pigs with simple chemical compounds are described. Positive skin effects were obtained, by the administration of small quantities, with 1 : 2 : 4 chlorodinitrobenzene, p-nitrosodimethylaniline, 1 : 2 : 4 trinitrobenzene, picryl chloride, four dichlorodinitrobenzenes, and a number of other aromatic compounds. In the case of a series of substituted benzenes (Cl, NO_2) a connexion between sensitizing capacity and lability of the Cl or NO_2 group has been shown, indicating the formation of conjugated antigens in the animal. Benzyl and acyl chlorides were also found to have sensitizing capacity. Experiments with acyl chlorides yielded information on the relation between reactions of the skin surface and anaphylaxis. G. pigs sensitized with p-chlorobenzoyl showed, on the one hand, the usual surface lesions after application of the substance and, on the other hand typical anaphylactic shock following injection (intraven.) of a compound of p-chlorobenzoyl chloride and g. pig serum; it is inferred that the two types of allergic manifestation are closely related conditions. Animals can also be sensitized to arsphenamine, so that a considerable percentage die in anaphylactic shock on intravenous injection of the substance.—J. M. Robson.

Maignon, F. (1936). Etude comparative, chez quelques espèces de mammifères, de la sensibilité de l'organisme aux substances parasympathico et sympathicomimétiques. Ses relations avec la gravité de l'anaphylaxie et de la tuberculose. [**Effect of Drugs on Sensitiveness of Animals to Anaphylaxis and Tuberculosis**].—*Rev. Path. comp.* **36.** 898-912. 13 tables. [4 refs.]

There is a relation between the sensitiveness of animals to anaphylaxis, to tuberculosis and to drugs affecting the sympathetic and parasympathetic nervous systems. The g. pig is very sensitive to pilocarpine and adrenaline, and to anaphylaxis and tuberculosis; the rat is comparatively insensitive to all these. Individual variations are found in man and are discussed.—J. M. Robson.

Jensen, B. H., Plum, N., & Werdelin, C. (1936). Hagelapprøvens Vaerdi ved Paavisning af Tuberkulose hos Høns. [**Wattle Tuberculin Test**].—*Maanedsskr. Dyrlaeg.* **48.** 145-150. 2 tables. [Reprinted in *Med. Stat. Vet. Serumlab. Copenhagen.* No. 160. pp. 145-151]. [English summary].

The authors carried out wattle tests on 403 hens, injecting 0·05 c.c. of avian tuberculin intradermally into one wattle and measuring the thickness each day for four days. They decided that an increase of 0·8 mm. should be regarded as a positive reaction. Eight days later a test was made in the other wattle. The hens were then killed and thorough autopsies carried out. Cultures were made on Löwenstein's medium from the spleen and liver of birds that showed no macroscopic tuberculosis. When only the first wattle test was made, 51% of the tuberculous hens gave positive reactions. When both the first and the second tests were used

64·4% reacted. The investigation shows that the wattle test as carried out was unreliable. The measurements ought to be made 24 and 48 hours after the injection of the tuberculin.—H. Berthelsen (Stockholm).

Montgomerie, R. F., & Rowlands, W. T. (1936). **The Efficiency of Commercial Lamb Dysentery Serum.**—*Vet. Rec.* **48.** 1481-1483. 5 tables. [1 ref.]

Poor results in the field led to the investigation of the antitoxic properties of five commercial brands of " lamb dysentery serum ", two of British and three of foreign origin. One British and one foreign brand were capable of neutralizing the toxin of *Clostridium welchii*, Type B, (lamb dysentery organism). The other British serum, while capable of neutralizing the Type C toxin to a certain extent, was very deficient in Type D antitoxin. The two remaining foreign brands contained no detectable lamb dysentery antitoxin whatsoever. M. and R. conclude that three of the five brands are totally unsuitable for the control of dysentery, and deprecate the fact that such sera can be sold as " lamb dysentery serum ".
—A. Wilson Taylor.

Prigge, R. (1937). Theorie und Methodik der Antigenmessung. [**The Theory and Practice of Assaying Antigens**].—*Z. Hyg. InfektKr.* **119.** 186-192. 5 figs. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 313. Signed W. W. C. Topley].

The author discusses the difficulties that are encountered in assessing the antigenic potency of diphtheria prophylactics, and in particular, the sampling errors that may arise from the varying immunizability of different animals of the same species. He gives a series of curves showing the range of dosage of a particular antigen required to immunize guineapigs against twelve lethal doses of diphtheria toxin. With the genetically heterogeneous stock of guineapigs employed at Frankfurt, the dose required to immunize the least immunizable animals was 32,000 times the dose required for the most immunizable. In an attempt to reduce this variability, four pure line strains of guineapigs, bred by brother-sister mating, were submitted to similar tests. With these strains the relations between largest and smallest doses required to induce the selected level of immunity were 14,000 : 1, 2,000 : 1, 100 : 1, and 25 : 1, respectively. It would thus seem possible, by using a selected inbred strain of test animal, greatly to reduce the variability in immunizing response, and so to reduce the number of test animals required to assess the potency of an antigen within any desired margin of error. It is noted that the mean, or median, dose required for immunization varies from one pure-line strain to another ; and it is also noted that the dose required for any strain in winter is significantly greater than the dose required in summer. [No detailed protocols are given, nor are the numbers of animals used in plotting the smooth curves stated.]

Delves, Edna. (1937). **Immunological Studies with Purified Serum Proteins Bearing on the Unitarian Theory of Antibodies.**—*J. infect. Dis.* **60.** 55-61. 4 tables. [11 refs.]

According to the unitarian theory, antibodies known by different names are really identical. One of the main difficulties in working on this problem has been the complexity of the antigens used, such as bacteria or red blood cells. In an attempt to overcome this difficulty, D. worked with purified protein fractions from human serum, *viz*, serum albumin and pseudoglobulin. Using collodion particles coated with these antigens, agglutination, precipitation and phagocytosis of the particles were obtained with homologous antisera. With the antigens in solution, complement-fixation could be shown with the same sera.

When precipitins were entirely removed by absorption with the homologous antigen it was found that agglutinins and opsonins had also been completely removed and the complement-fixing power of the antiserum greatly reduced. D. considers this as indirect evidence in support of the unitarian theory of antibodies.
—A. Robertson.

Schmid, F. (1936). Zur Frage der Immunität bei parasitären Krankheiten und ihrer Bedeutung für die Bekämpfung. **[The Question of Immunity to Parasitic Diseases and its Importance in Control].**—*Z. InfektKr. Haustiere.* **49.** 177-207. 2 tables.

S. reviews the literature on the question of the production of immunity against protozoan and helminth parasites. It is pointed out that natural resistance to infection may be dependent upon species, race, individual idiosyncrasy or age. Acquired immunity may be divided into immunity against the pathological action of a parasite, immunity against reinfection after recovery, and immunity against superinfection by a species of parasite which the host already harbours ("premunity"). The type of immunity acquired against the various classes of parasites involved is discussed, and in many cases experiments carried out by the author are recorded.

It is concluded that, in the case of blood protozoa, some form of immunity can be acquired, but that it is usually only sufficient to protect against superinfection. Immune animals harbour the causal organism and become reservoirs of disease. Passive immunity cannot be conferred, and sterilization by drug treatment leads to loss of immunity and susceptibility to reinfection.

In the case of epithelial protozoa, the experiments indicated that the immunity of fowls to *Eimeria tenella* was ascribable to age and was not necessarily dependent on recovery from a previous infection. He was unable to detect any immunity to reinfection or superinfection in either rabbit coccidiosis or duodenal coccidiosis of fowls, but in the latter case apparent superinfections might have been due to species of coccidia other than the existing infection. There was some indication that a previous infection might give some protection against the development of serious disease as a result of subsequent infections.

In hookworm infections there appears to be no immunity to reinfection and no age immunity, but there may be an immunity to superinfection.

No immunity from ascaris infections can be acquired, but the rarity of adult infection seems to indicate an age immunity which can be broken down by malnutrition.

In lungworm infections it is concluded that immunity to infection is dependent on age [compare Taylor on infection of adult cattle – *V. B.* **6.** 350.], but that many individuals develop immunity to the pathological action of the parasites.

In infections with trichinae, equine strongyles and stomach worms of ruminants, immunity either from reinfection or from superinfection could not be detected, and Taylor's observations [*V. B.* **4.** 752.] indicating the acquisition of a resistance to stomach worm infection in ruminants are explained as an example of accommodation, or resistance to pathogenic action. Summarizing these results, S. concludes that in nematode infections there is no evidence of immunity to reinfection or to superinfection, but that in most cases an age resistance exists and there may be resistance to the development of serious disease on such reinfection. Malnutrition favours infection, and there is some evidence that intestinal irritation, resulting in diarrhoea, may eliminate some species of helminths.

Attempts to create immunity by mild infections only create parasite carriers, and should never be undertaken in uninfected areas. Parasites only have a limited

span of life in the vertebrate host, and parasitic diseases can be best controlled by preventing reinfections. Good feeding plays an important part in control as it assists in the elimination of parasites, and prevents disease manifestations whilst it may also prevent superinfection which would otherwise occur.—U. F. R.

DISEASES, GENERAL.

POISSON, H. (1936). Helminthiases et tuberculose. [**Helminthiases and Tuberculosis**].—*Bull. Soc. Path. exot.* **29.** 931-933.

P. renews the question as to there being some antagonism between infection with cestodes and tuberculosis, human beings and animals infected with cestodes being thereby rendered resistant to the development of tuberculosis. He gives a brief account of some epidemiological evidence in Madagascar which appears to support this hypothesis.—E. L. TAYLOR.

PLUM, N. (1936). Indtryk fra en Rejse. [**A Tour in Germany and France**].—*Medlemsbl. danske Drylaegeforen.* **19.** 475-495.

The tuberculosis campaign in Germany is now being based more and more on the tuberculin test. Exhaustive field investigations on 400,000 to 500,000 animals in 18 different districts in Germany are now being carried out. Tuberculin from a synthetic medium is used and the tests are judged in a similar way to those made in Denmark. Reactions caused by bacilli of the avian type are not noted because they are thought to be unimportant. In the same districts experiments on the control of brucellosis with the aid of the agglutination test are also carried out. A number of other diseases and impressions about different places are mentioned.—H. C. BENDIXEN (COPENHAGEN).

BRYANT, J. B. (1936). **Some Phases of Swine Practice.**—*J. Amer. vet. med. Ass.* **89.** 640-651. [1 ref.]

This is a résumé of swine practice in the U.S.A., and contains useful suggestions concerning many of the common ailments of pigs. The chief interest centres in B's comments on the serum-virus prophylaxis against swine fever. He finds this unsatisfactory for young pigs in his area and recommends that the problem of swine fever and other infections should be approached from another direction, by a system of publishing particulars of outbreaks, so that pig raisers can avoid purchasing from known infected premises. Better hygiene is advocated for swine dysentery, which remains an obscure and increasing menace, and for necrotic enteritis. Other diseases are also dealt with.—C. V. WATKINS.

TEN THIJE, J. H. (1936). Ziekten bij varkens. [*Post-Mortem* **Diagnosis of Pig Diseases**].—*Tijdschr. Diergeneesk.* **63.** 1313-1324. [English, French and German summaries].

The *post-mortem* differential diagnosis of swine fever, swine plague and other infections is discussed at length.

Coccal infection was found in 18% of all pigs examined by the author in 1935, a common clinical example of which was fibrinous polyarthritis often followed by purpura. Another condition associated with coccal infection was a crusty eczema which is probably identical with " rust " or " soot ".

—M. J. J. HOUTHUIS (ROTTERDAM).

I. Robb, W. (1936). **Hereditary Diseases.**—*Vet. Rec.* **48.** 811-815.

II. Mitchell, W. M. (1936). **A General Consideration of the Disease Conditions Mentioned in the Horse Breeding Acts.**—*Ibid.* 1365-1374. Discussion pp. 74-82. 4 figs. [10 refs.]

III. Campbell, D. M. (1937). **Skeletal Disease of the Horse.**—*Ibid.* **49.** 139-144. [Also appeared in *Vet. Bull. U.S. Army.* **31.** 40-58].

IV. Anon. (1936). **Licensing of Stallions Under the Horse Breeding Act, 1918 [Great Britain].**—*J. Minist. Agric.* **43.** 870-872. 2 tables.

I. R. as a believer in the hereditary origin of diseases mentioned in the Horse Breeding Act, 1918, of Great Britain, gives circumstantial evidence in support of this origin as regards shivering, stringhalt, sidebone, cryptorchidism, scrotal hernia, roaring and splints. He is sceptical of the theory that these diseases are of nutritional origin and refers to the high degree of freedom from these diseases in Highland and Shetland ponies.

In a discussion Mitchell gave evidence of connexion between diet and disease in horses.

II. M. [see also *V. B.* **4.** 375.] drew attention to the weakness of the expert evidence given to the Royal Commission of Horse Breeding 1889, the report of which formed the basis of the present official list of hereditary diseases of horses. Finding that horses affected with one or more of the above diseases commonly show a complex set of bone, joint and nerve lesions on detailed *post-mortem* examination, he formed the theory that a single fundamental cause may be operating and now applies the term " rheumatic disease " to them. Lessons from comparative physiology and pathology suggest that " rheumatic disease " in horses may be partly at least of nutritional origin : *ad hoc* research on horses has, however, not yet been done in Great Britain. Heredity, trauma, infection and worm infestation cannot account themselves for " rheumatic disease ". M. has frequently found a characteristic localized degeneration of one or more of the large peripheral nerves in horses affected with one or other form of lameness, for which no parallel in human pathology has been found. This is illustrated in photomicrographs : its nature is not understood.

In the discussion which followed DeVine spoke of the problem from the practical clinical aspect, much of which supported the theory of heredity, but he advocated systematic research. Pryer discussed it in the light of experience of an army veterinary officer and criticized M's conclusions. Observations on 750 army horses, of which 56 were cast, gave little clinical evidence that horses affected with one bone disease, *e.g.* navicular disease, were also affected with other bone diseases as M. has often found. Only 10 of the 56 cast horses had a history of strangles. Linton described tests in Scotland on 133 livers of horses for vitamin A content. He found it very low, but declined an opinion as to its significance. He stated that mare's colostrum is rich in vitamin A, but that the normal milk is nearly devoid of it. Harvey gave evidence that many diseases of horses in country districts are the results of bad rearing and feeding.

Other persons also contributed. In reply M. read a letter from Greenlee (U.S.A.) who thereby linked up research on " rheumatic disease " in Great Britain and the United States and the Philippine Islands. [See III].

III. By observations on army and other horses in the U.S.A., C. came to the same conclusions as Mitchell, in asserting that there exists a general nutritional disease of horses in which there is multiple osteo-arthritis, nerve degeneration, and a characteristic shifting lameness. The advanced stage not seen in England is manifested by softening and bulging of the facial bones. This occurred in 1925 when U.S. army horses were sent to the Philippine Islands. The condition was

named " big head ". KINTNER and HOLT proved it to be a nutritional disease due to an excessive P : Ca ratio [*V. B.* **3.** 264]. The same disease (general osteodystrophia, but not advanced to the " big head " stage) was observed by C. in U.S. army horses at Fort Benjamin Harrison in 1932 and responded spectacularly to a change of diet to correct the P : Ca ratio. The lesions observed were identical with those reported by MITCHELL in Scotland.

This article is enhanced in value by a historical review of the disease in North America over the last 100 years.

IV. In 1936, 2,050 stallions were licensed in England and Wales and 74 were refused licences on the ground of diseases declared to be hereditary according to the Horse Breeding Act of 1918. [They include whistling, roaring, sidebone, cataract, shivering, ringbone, bone spavin, defective genital organs, poor physique and conformation and inadequate prolificacy].—J. E.

FAGIOLI, O. (1936). Contribuo allo studio della respirazione del cavallo bolso. [**Respiration in Broken-Winded Horses**].—*Nuova Vet.* **14.** 61-68. 10 figs.

F. discusses various theories for the phenomenon of expiration in a broken-winded horse. He describes an apparatus that is passed *per rectum*, to register the respirations by graphs. It has the advantage of being independent of movements of the abdominal walls, and is similar to one that has been used with success by LUCIANI on small animals. F. considers that the apparatus he describes is more satisfactory, and he details experiments that he has made on both sound and broken-winded horses. In each case the graphs confirm his observations on the flank movements. He feared that the graphs might be caused by the pulse, but they were checked and found not to synchronize with the respiratory movements.
—S. F. J. HODGMAN.

FAURE, L. (1936). Silicose accidentelle des ovins sahariens. [**Silicosis in Saharan Sheep**].—*Rev. gén. Méd. vét.* **45.** 577-581. [6 refs.]

This condition was noticed in sheep of all ages in abattoirs in North Africa. The bronchi contain a profuse mucous exudate, in which gritty material is embedded. There is no change in the colour of the lungs, but particles are also found in the lung tissue. This is explained by the fact that when sheep are moving in desert country, they raise immense clouds of dust, some of which is naturally drawn into the bronchi. F. considers that, also, when drinking, their feet stir up sand in the water and that some of these particles are absorbed from the bowel by lymphocytes and deposited by them in the substance of the lung.—A. W. T.

CANITANO, G. (1935). Contributo clinico sperimentale alla conoscenza della etiopatogenesi della congiuntivite enzootica del cavallo. [**Aetiology and Pathogenesis of Enzootic Conjunctivitis in the Horse**].—*Nuova Vet.* **13.** 127-132.

C. describes epidemics amongst cavalry horses, which he has treated successfully with a solution of silver nitrate, and also by washing the conjunctival sac of the unaffected in-contact horses with corrosive sublimate, as a prophylactic measure. He has isolated diploccoci and streptoccoci from the discharge from suppurating lesions. He ascribes the epidemics to dust, flies, and strong light.—S. F. J. H.

DOMENICO, G. (1936). La hematuria de los bovinos por la cistitis crónica hemorrágica vegetante. [**Chronic Haematuria Vesicalis in Colombia**].—*Rev. Med. vet., Bogotá.* **7.** 113-120.

This disease is the cause of considerable mortality amongst cattle in various

parts of the Republic of Colombia. The worst lesions are found in the mucous membrane of the bladder ; they consist principally of hyperplasia of the connective tissue, cellular infiltration and stasis of the venous and capillary systems.

The cause is not a bacterial infection, and the disease is only found in districts where the soil is poor and probably deficient in Ca and P. Conclusive improvement is noticed in animals changed to richer soils.—W. L. Marshall.

Butozan, V. (1935). Hronička hematurija goveda u Vrbaskoj banovini (Haematuria chronica bovis). [**Chronic Haematuria of Cattle in Yugoslavia**]. —*Jugoslov. vet. Glasn.* **15.** 225-233. [5 refs.]

A description of a chronic haematuria of cattle (haematuria vesicalis), observed by B. in the Vrbas Banovina, Central Yugoslavia [*V. B.* **5.** 251]. No parasites are found in the blood corpuscles. Affected animals gradually weaken. The findings in the kidneys and in the urinary bladder are conspicuous. Either bleeding or inflammation is observed in the kidneys. B. says that this disease appears in horses also. He is of the opinion that unsuitable feeding may be responsible for the disease, and he is convinced that it is provoked by continuous chemical irritation of the kidneys and bladder.—B. Oswald (Skoplje).

Kirsch, W. (1936). Untersuchungen über Lecksuchterscheinungen bei Kühen aus dem Grossen Moosbruch (Ostpreussen). [**Pica in Cows in East Prussia**].—*Züchtungskunde.* **9.** 411-422. 3 figs., 8 tables. [3 refs.]

Hay from the Grosse Moosbruch district in East Prussia produced pica and emaciation when fed as the only source of diet to 3 experimental cows, although chemical analysis revealed no outstanding deficiency. Mineral supplements, including Ca phosphate, and vitamin supplements such as irradiated yeast, were not alone capable of obviating the disorder, but a moderate supplement of oats and barley straw, or oats and potatoes, was effective. The cows then rapidly increased in weight despite continued consumption of as much pica-producing hay as before, from which it was concluded that the disorder is not caused by a toxic principle, but by lack of some essential organic substance present in hay from pica-free meadows, in barley straw, in oats, and in potatoes.—H. H. Green.

Green, H. H. (1935). **Minerals in Relation to Diseases of the Larger Domesticated Animals.**—*Emp. J. exp. Agric.* **3.** 363-378. [Numerous refs.]

This paper is a highly condensed survey of a very wide field and cannot well be abstracted further. The dietary significance of P, Ca, Mg, Fe, Cu, I, F, Cl, Na, and K is discussed with reference to diseased conditions in the animal, such as osteoporosis, osteomalacia, rickets, osteofibrosis, nutritional anaemias, and disorders characterized by low blood minerals.—R. Allcroft.

PUBLIC HEALTH.

Turkey. (1936). Instructions du 29 juillet 1935, du Ministre de l'Hygiène et de l'Assistance sociale, établies en application de l'article 171 de la loi sur l'hygiène publique et portant règlement sur les variétés et les caractères du lait, ainsi que sur les conditions sanitaires du matériel et des locaux destinés à l'industrie laitière et à la vente des produits laitiers. [**Order of Ministry of Hygiene on Grades and Standards for Milk, Byres and Dairies**].—*Bull. Off. int. Hyg. Publ.* **28.** 1876-1883. [3 refs.]

An official publication setting forth the regulations now in force in Turkey as

regards the production and sale of milk and milk products. The state of health of the animals, composition of the milk, veterinary inspection, methods for ensuring cleanliness in production and in bottling, pasteurization, and regulations for sale are dealt with in detail.—N. J. Scorgie.

Bang, F. (1937). Ueber Beziehungen zwischen Schweinehaltung und dem Vorkommen von Milchsäurestreptokokken in Milch und Milchprodukten. Das "gewöhnliche" Milchsäurebakterium. **[On the Relationship of Pig-Farming to the Occurrence of Souring Streptococci in Milk and Milk-Products]**.—*Zlb. Bakt. II.* **95.** 390-415 and 449-468. [Numerous refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 448. Signed C. C. Okell].

In Denmark, butter making and pig farming are carried on very extensively and in close association the one with the other. The success of the two industries is to some extent interdependent, since the first-class quality of Danish pork and bacon depends upon the feeding of the pigs with the by-products of the dairy industry (buttermilk, whey, etc.). The author enquires whether the benefits of the two branches of industry may not be reciprocal and whether the presence of swine in the neighbourhood of dairies may not provide the necessary source of lactic-acid organisms for dairy purposes. In pursuance of this enquiry the following results were obtained :– Lactic acid streptococci develop to an incomparably greater degree in the intestines of pigs than in cows and calves. *Streptococcus lactis* develops only in the intestines of pigs which have been fed on cows' milk or its products. The organism cannot be isolated from sucking-pigs which have only been fed on sows' milk. A bacteriological analysis of the air in pigsties showed that *Str. lactis* is present in abundance and that these streptococci are capable of rapid multiplication in cows' milk. In cow-sheds few of these bacteria are found. It was found that many strains of *Str. lactis* failed to develop on agar plates, but could be freely grown in milk tubes.

I. Heyck. (1936). Ist bezüglich des Nesselfiebers (Backsteinblattern) eine Aenderung der Ausführungsbestimmungen A, C und D zum Reichsfleischbeschaugesetz notwendig ? **[Need for Alteration of the Reich Meat Inspection Regulations regarding Skin Lesions in Swine Erysipelas]**.—*Z. Fleisch- u. Milchhyg.* **46.** 277-279. [2 refs.]

II. Kolbe, F. (1936). Die fleischbeschauliche Beurteilung des Rotlaufes des Schweines. **[Meat Inspection Decision regarding Swine Erysipelas]**.—*Ibid.* 338-340. [11 refs.]

III. Junack, M. (1936). Zur Beurteilung der Backsteinblattern. Die dritte, offensichtliche Form des chronischen Rotlaufes, Lokalisation in der Milz. **[Connexion between Urticaria and Swine Erysipelas : Spleen Infection]**.—*Ibid.* 337-338.

I. H. desires an amendment in the existing law, which only provides for a clinical examination of pigs with skin lesions of swine erysipelas. He considers that a bacteriological examination of internal organs, especially the spleen and kidneys, should be made for the bacilli as otherwise cases are missed.

II. In reply, Kolbe insists that the existing meat laws fulfil all necessary hygienic demands. The mere presence of the bacilli does not justify a diagnosis of swine erysipelas. Such a diagnosis should be made only after a clinical, pathological and anatomical examination. K. maintains that human infection through the consumption of diseased pigs' flesh is almost unknown, and that external infection may be avoided by thorough disinfection of hands and arms.

III. While not agreeing with Heyck as regards the need for a bacteriological

examination of spleen and kidneys in all cases with skin lesions, J. nevertheless believes that in all such cases and in those with endocarditis, the spleen and kidneys should be destroyed, and that in acute cases there should be an exhaustive cultural examination of the internal organs.—M. BURKE.

POUSKA. (1936). Prohlídka masa na trichiny v Polsku. [**Inspection of Meat for Trichinella in Poland**].—*Zvěrolék. Obz.* **29.** 384-387.

The inspection of meat in Poland for trichinella is founded on the regulations issued by the Ministry of Agriculture in 1929. The regulations prescribe the course and technique of the inspection, which is carried out by veterinarians or meat inspectors.—E. PŘIBYL (BRNO).

LERCHE, M., & BARTEL, H. (1936). Untersuchungen über die Epidemiologie des Bacterium enteritidis Breslau. [*Salmonella typhi-murium* **Infection causing Meat Poisoning**].—*Tierärztl. Rdsch.* **42.** 685-689 and 707-711. 2 tables.

The common cause of salmonella food poisoning in Germany is *S. t.-m.* and it was considered desirable to see to what extent this infection is prevalent in domestic livestock. To do this, all animals on farms from which a carrier of *S. t.-m.* was known to have come were examined for infection (faeces examination and serological test), a positive serological reaction being taken as presumptive evidence that the animal was a carrier.

Of 276 cattle exposed to natural infection, 28 were carriers, of 35 horses 2 were carriers, of 483 pigs 7 were carriers, of 314 geese 35 were carriers, and of 113 ducks 24 were carriers. Experimental infection was also attempted. The findings under both natural and experimental conditions indicated that domestic animals do not readily become carriers of infection. It is considered that rats and mice constitute the natural reservoir of infection and that bacteria are broadcast in their excrements.—E. J. PULLINGER.

I. UNITED STATES OF AMERICA. (1936). **Refrigeration of Foods and Its Relation to Present-Day Public Health.**—*Amer. publ. Hlth Ass. Yearb. 1935-1936.* pp. 47-51.

II. UNITED STATES OF AMERICA. (1936). **Milk and Dairy Products.**—*Ibid.* pp. 54-57. [2 refs.]

III. UNITED STATES OF AMERICA. (1936). **Examination of Dairy and Food Products.**—*Ibid.* pp. 108-110.

IV. UNITED STATES OF AMERICA. (1936). **Aspects of Veterinary Public Health.**—*Ibid.* pp. 101-102.

I. In the report of the Committee on Foods, it is pointed out that, to-day, refrigeration is of paramount importance and a necessity from the standpoint of economics, health and convenience. It is shown that fruits and meats are best stored in an atmosphere containing gases, especially carbon dioxide. The quick-freezing method, which was first applied to fish, is being extended to many other food-products, including meat, shell-fish, vegetables and fruits. Such refrigerated foods require continuous low temperatures to minimize the growth of micro-organisms and to prevent the biochemical activity of enzymes. Unless low temperatures are maintained, the products may spoil and may prove harmful to the consumer.

Refrigeration is now extensively used in bakeries, breweries, storage factories and yeast plants. It is not a substitute for cleanliness and requires strict supervision.

II. This report emphasizes the lack of uniformity in regard to the control of vitamin D milk, and suggests uniformity of control similar to that used for the Vitamin Section of the Drug Division of the Food and Drug Administration

(U.S.A.). It further remarks that permissive pasteurization on the farm is allowed for certified milk. Such milk is now on sale in many large cities in the U.S.A. The " standardization " of certified milk necessitated manipulation in the course of bottling, etc., and consequently the risk of contamination. In some instances this has been discontinued, especially in the case of milk which is used for infant feeding. It is also pointed out that traders issue erroneous and prejudiced propaganda in connexion with advertisements for milk, which are misleading to the consumers.

III. The report of the Standard Methods Committee, which maintains contact with 1,000 laboratories in the U.S.A., shows that an attempt is being made to introduce standard laboratory methods for the examination of dairy products. The report further points out that, in the next edition of the Standard Methods for the Examination of Dairy Products which will shortly be issued, there will be included Hagan's methods of detecting tubercle bacilli in milk and Huddleson's methods of detecting brucella organisms in milk.

IV. Veterinary public health officers in the U.S.A. are employed principally on :– (1) meat inspection ; (2) milk inspection ; (3) bovine tuberculosis control ; (4) inspection of biological products ; (5) immunology ; (6) bacteriology ; (7) serology, and (8) rabies control.—Brennan DeVine.

THERAPEUTICS.

I. Bennett, S. C. J. (1936). **The Treatment of Equine** *Trypanosoma congolense* **Infections with Surfen C (Bayer).**—*J. comp. Path.* **49.** 151-159. 1 table.

II. Soulié, P., Borde, & Chevret. (1936). La chimiothérapie de la trypanosomose du cheval de Syrie. [**Chemotherapy of Equine Trypanosomiasis in Syria**].—*Bull. Soc. Path. exot.* **29.** 682-688. 1 table. [1 ref.]

I. " Surfen C " is capable of curing nearly all, if not all, cases of *Tryp. congolense* infection in horses. There is great variability of individual response. Some horses are cured by a single dose of 1 g. per 100 kg. body weight, while others require much more. It is unsafe to administer the drug intravenously. When it is given subcutaneously large swellings develop at the site of injection. Local swellings may also develop when it is injected intramuscularly. No toxic symptoms were observed.

II. Satisfactory chemotherapeutic results were obtained with " naganol " given together with " trypoxyl ", tartar emetic and anthiomaline. The doses suggested for horses are :– " naganol " 0·01 g. per kg. ; " trypoxyl ", 0·01 g. per kg. ; tartar emetic, 0·004 g. per kg., and anthiomaline, 0·003 g. per kg. In dogs, trypanosomes disappear within four hours of the administration of " naganol " and anthiomaline, and the subsequent refractory period lasts for more than 70 days.—J. M. Robson.

Oesterlin, M. (1936). Zur Chemotherapie der Piroplasmosen. [**Chemotherapy of Piroplasmoses**].—*Zlb. Bakt. I.* (*Orig.*). **137.** 419-423. 3 figs. [7 refs.]

Highly susceptible dogs were injected with *Babesia gibsoni* and the effects of compounds containing active oxygen (hydroquinine peroxide, urea peroxide, hydrogen peroxide) were investigated. The effects of these agents come on relatively slowly and can, therefore, not be due to a direct action ; the substances are relatively unstable and even at 0°C. in the dark are destroyed by catalase in eight days. Repeated administration of large doses does not destroy all the parasites. A marked fall in weight occurs in the early stages of the treatment and later on there is

an increase in the weight. The changes in weight are due to the processes of cure associated with destruction of the organism and of the erythrocytes. An equilibrium is finally reached, which can no longer be affected chemotherapeutically by the peroxide. The mechanism of the effects is discussed with especial references to changes in the partial pressure of oxygen in the blood.—J. M. Robson.

Enigk, K. (1936). Untersuchungen über die Abtötung der Spulwurmeier und Coccidienoocysten durch Chemikalien. [**Lethal Effect of Chemicals on the Eggs of Nematodes and the Oocysts of Coccidia**].—*Arch. wiss. prakt. Tierheilk.* **70.** 439-448. 4 tables. [Numerous refs.]

Many of the usual disinfectants employed against the eggs of nematodes and coccidian oocysts are inefficient. This paper treats of the lethal nature of various reagents on worms and cysts. Carbon bisulphide, chloroform, 96% ethyl alcohol, 50% ethyl alcohol, ether, carbon tetrachloride, benzol, xylol, acetone, petroleum and benzene were tested. 2% carbon bisulphide gave 100% mortality of nematode eggs after treatment for five minutes and 30 seconds respectively. The lethal effect was attained in the shortest time by 2% carbon bisulphide. The time of treatment was substantially reduced if phenol was added. 2% carbon bisulphide with the addition of 2% phenol caused 100% mortality amongst nematode eggs after 20 seconds and amongst coccidian oocysts after 20 seconds. This acceleration was noted in the other reagents when phenol was added, but it would appear that carbon bisulphide plus phenol is the most efficacious of those examined. The experiments were conducted on the eggs of *Toxascaris leonina* and *Toxocara canis*, and the oocysts of *Eimeria perforans*.—C. Horton-Smith.

Gordon, H. McL., & Ross, I. C. (1936). **Medicinal Treatment of Trichostrongylosis. Efficiency in Lambs Exposed to Continuous Infection.**—*Aust. vet. J.* **12.** 111-113. 1 graph. [4 refs.]

Sheep exposed to daily infection with 4,000 larvae of *Trichostrongylus* spp. did not develop trichostrongylosis, and grew satisfactorily when treated with appropriate doses of a 2% solution of copper sulphate and commercial nicotine sulphate at intervals of three weeks. Sheep similarly exposed to infection, but treated with copper sulphate followed by tetrachlorethylene appeared also to receive a high degree of protection. Untreated control sheep succumbed to trichostrongylosis in from 70 to 117 days after the administration of larvae began. A group of sheep similarly infected but immunized against *Clostridium ovitoxicum* and not treated, succumbed in from 89 to 141 days.—H. McL. Gordon.

Kennan, H. C. (1936). **The Effect of Carbon Tetrachloride on Sheep.**—*Aust. vet. J.* **12.** 150-153. [1 ref.]

Young sheep drenched (a) fortnightly or (b) monthly with either 1 ml. or 5 ml. of carbon tetrachloride for ten months, showed satisfactory growth, and did not suffer any recognizable ill-effect. On *post-mortem* examination there was no evidence of liver damage and the flesh was not affected as regards " toughness " or palatability. Old fluke-free sheep drenched (a) fortnightly or (b) monthly with either 1 ml. or 2 ml. of carbon tetrachloride for ten months suffered no ill-effect, and on *post-mortem* examination no damage to the liver could be detected. Livers were examined both macroscopically and microscopically. Pregnant ewes drenched monthly with 2 ml. during the last four months of the gestation period, and thereafter for another four months, lambed and raised their lambs without showing any ill-effects from the drug.—H. McL. Gordon.

I. Cory, E. N., Harns, H. G., & Anderson, W. H. (1936). **Dusts for Control of Flies on Cattle.**—*J. econ. Ent.* **29.** 331-335.

II. Pearson, A. M. (1935). **The Role of Pine Oil in Cattle Fly Sprays.**—*Tech. Bull. Univ. Del. agric. Exp. Sta.* No. 196. pp. 63. 45 figs., 37 tables. [13 refs.]

I. In 1933, experiments were carried out to determine the efficacy of certain materials for the control of flies on cattle. Sixteen dusts and one spray – consisting of pyrethrum and derris mixed at various percentages, and some with added pine oil – were used in a preliminary test. During the course of this work the spray (due to a report of its deleterious effects on the cattle) and all except the four highest rated dusts, were eliminated from the list of suitable materials. Those which comprised ground pyrethrum, "black arrow," 50% pyrethrum and 50% "treni dust", and the same materials with the addition of 10% pine oil, were continued as a basis for subsequent tests the following year, when all showed a high degree of efficiency.

Laboratory tests disclosed the fact that the effectiveness of the dusts is largely due to the actual lethal qualities and the addition of pine oil has little effect on the results obtained.

II. The formulae for the cattle-fly spray in general use at the present time consist of a petroleum oil base with which is incorporated some toxic and/or repellent ingredient such as pyrethrum, derris, or pine oil. Certain synthetic materials have also been developed for this purpose. A number of experiments are recorded, from which it is concluded that pine oil increases (activates) the toxicity, and also the repellent properties of pyrethrum extract in relation to the amount added.

The repellent property of derris extract is also increased by the addition of pine oil, but not in the same proportion as that of pyrethrum extract, and it is stated that pine oil may be safely and economically employed in practical formulae for cattle-fly sprays.—J. M. L. Penhale.

Naito, T., & Oka, S. (1936). Untersuchungen über die Festigkeit von Trypanosomen gegen Arsenpräparate. [**Arsenic-Fastness of Trypanosomes**].—*Zlb. Bakt. I. (Orig.).* **137.** 401-418. 8 tables. [Numerous refs.]

Treatment of *Tryp. prowazeki* infection with gradually increasing doses of orsanin (2-oxy-4-acetaminophenyl-1-arsenious acid) produced a maximal fastness after 13 passages; similar experiments with "neosalvarsan" and neosilver salvarsan produced an almost complete resistance after 50 passages. The trypanosomes resistant to orsanin, "neosalvarsan" and neosilver salvarsan were still affected by arsenophenylglycin, solusalvarsan, etc. but not by "tryparsamide", "trypaflavine", etc.—J. M. Robson.

Fischer. (1936). Die Kupferbehandlung anämischer Zustände. [**Treatment of Anaemia with Copper**].—*Tierärztl. Rdsch.* **42.** 860. [8 refs.]

Horses suffering from anaemias of various aetiology were injected (intraven.) with a proprietary copper preparation. Three injections of from 30 to 100 c.c. at weekly intervals produced satisfactory results. It is suggested that copper stimulates the formation both of haemoglobin and of erythrocytes.—J. M. Robson.

Hanne, R. (1936). Ein Wort zu der Frage der Prüfung von Desinfektionsmitteln. [**The Testing of Disinfectants**].—*Zlb. Bakt. I. (Orig.).* **137.** 214-223. 2 tables. [16 refs.]

H. emphasizes the value of the suspension method in the testing of disinfectants,

as it gives good comparative results. The time during which organisms remain alive should be taken as a basis of comparison. The organisms to be used are *Bact. coli*, *Staphylococcus* and *Chromobact. prodigiosum*. The investigation is not complete until the effects of small dilutions have been determined.—J. M. Robson.

I. Sherwood, R. M., & Fraps, G. S. (1936). **Constituents of Wheat Gray Shorts which Prevent Slipped Tendon.**—*Poult Sci.* **15.** 424.

II. Sherwood, R. M., & Fraps, G. S. (1937). **Constituents of Wheat Gray Shorts which Prevent Slipped Tendons.**—*Ibid.* **16.** 109-111. 2 tables. [Numerous refs.]

I. A preliminary version of II.

II. The experimental feeding of chickens to the age of 12 weeks on a ration which was known to produce a high percentage of slipped tendon but was modified by the substitution for part of the kafir [a sorghum], of 20% wheat gray shorts or of some fractions equivalent to 20%, showed that the factor which prevents slipped tendons is not an organic substance, but is one or more of the mineral constituents of the ash of wheat gray shorts.—R. Allcroft.

Anon. (1937). **Limonite for Stock-Lick Purposes.**—*N. Z. J. Agric.* **54.** 175.

Limonite samples from Okaihau quarries vary considerably in Co content up to 250 parts per million. Selection of rock is being made so as to produce a commercial limonite for licks with a 200 p.p.m. content of Co.—C. S. M. Hopkirk.

van der Kaay, J. C. (1936). Voorloopige mededeeling omtrent de invloed van subcutane toediening van pregnyl op het geslachtsapparaat van het kalf, de pink, de big, het varken en de hond. [**The Influence of Subcutaneous Injections of " Pregnyl " on the Sexual Organs of the Calf, Heifer, Piglet, Pig and Dog**].—*Tijdschr. Diergeneesk.* **63.** 1093-1098. [English, French and German summaries].

Investigations were made with anterior pituitary hormone preparations, " pregnyl " and in some cases with " ambinon " as well. With the calves and heifers it was possible to cause a maturation of the follicle by injection of such products. No corpora lutea developed.

In 3 piglets and 1 pig an enlargement of the ovaries and also of the uterus occurred. In the ovary large follicles were formed containing clear liquid and also blood and corpora lutea. In dogs the same phenomenon occurred, and oestrus, was induced in one case.—M. J. J. Houthuis (Rotterdam).

Anon. (1936). **Non-Specific Protein Therapy.**—*Vet. Rec.* **48.** 1489-1491. [2 refs.]

The foreign proteins used therapeutically are described. The mechanism of the reaction is discussed with reference to the parts played by fever, mobilization of specific immune bodies in the blood, leucocytosis and liberation of enzymes into the blood stream. Some of the possible clinical applications are reviewed ; emphasis is laid on the possible uses in veterinary medicine (*e.g.*, diseases of the skin and of the eyes). Much critical work still requires to be done.—J. M. Robson.

POISONS AND POISONING.

Franke, K. W., & Moxon, A. L. (1936). **A Comparison of the Minimum Fatal Doses of Selenium, Tellurium, Arsenic and Vanadium.**—*J. Pharmacol.* **58.** 454-459. 1 table. [18 refs.]

Minimum lethal doses of the following elements to rats by intraperitoneal injection were taken as those killing off 75% or more in less than two days. Symptoms are described and the M.L.D. compared with those found by other workers.

(1) Se as $Na_2 Se O_3$	3·25 – 3·5 mg. Se per kg. body weight	
„ $Na_2 Se O_4$	5·25 – 5·75 " " "	"
(2) Te as $Na_2 Te O_3$	2·25 – 2·5 " Te "	"
„ $Na_2 Te O_4$	20 – 30 " " "	"
(3) As as $Na_2 H As O_3$	4·25 – 4·75 " As "	"
„ $Na_2 H As O_4$	14 – 18 " " "	"
(4) V as $Na VO_3$	4 – 5 " V "	"

Molybdenum was safe up to 160 mg. per kg. —Alfred Eden.

Witter, J. F. (1936). **A Preliminary Report on the Injurious Effect of Sodium Bicarbonate in Chicks.**—*Poult. Sci.* **15.** 256-259. 3 tables. [3 refs.]

The administration of sodium bicarbonate in drinking water results in damage to the kidneys, and in the production of a condition comparable to visceral gout. Various strengths of the solution were used, ranging from 0·6% to 2·4%. The weak solution was harmful only to chicks under three weeks of age; mature cockerels were injured by a 2·4% solution, but not by one of 1·2%.—W. J. I.

PHYSIOLOGY.

Bressou, & Florentin. (1937). L'amygdale staphyline des mammifères. [**The Tonsils in Mammals**].—*Rec. Méd. vét.* **113.** 5-13. 6 figs.

An anatomical and histological description of the tonsils found in mammals. —A. Robertson.

Hammar, J. A. (1936). Die normal-morphologische Thymusforschung im letzten Vierteljahrhundert. Analyse und Synthese nebst einigen Worten zu der Funktionsfrage. [**Research on the Normal Morphology of the Thymus during the last 25 Years**]. pp. 453. 39 figs., 2 tables. [Numerous refs.] Leipzig: Johann Ambrosius Barth. [8vo].

This is a comprehensive review of the biological and medical literature and includes work on animals in general including domestic animals. Workers interested in the normal thymus of the latter should certainly see this book which has a 60-page bibliography.—J. E.

Huggins, C. (1937). **The Composition of Bone and the Function of the Bone Cell.**—*Physiol. Rev.* **17.** 119-143. [Numerous refs.]

Composition.—Bone contains about 50% of water and anything up to 25% of fat, but these two components are very variable. Dried fat-free bone has a more uniform composition containing some 30% to 40% of organic matter whilst the rest is inorganic. The organic matter is identical in composition with ordinary connective tissue, containing collagen, mucin, etc. The chief inorganic constituents are Ca, phosphate, carbonate, chloride, Mg and Na, of which the first three are greatly predominant. The Ca and PO_4 fractions are relatively constant but the carbonate fraction varies greatly, and it is incorrect to assign a clearly defined chemical formula to the inorganic constituents of bone, regarding bone as a single substance of fixed composition.

The skeleton contains almost 99% of the Ca in the body, the most important salts being the Ca phosphates. The same approximate molarity ratio

Ca : P :: 1 : 0·6 has been nearly uniformly obtained in various healthy mammalian and fish bones, and in a wide variety of pathological conditions such as rickets, scurvy in animals on low P diets, and after massive doses of irradiated ergosterol. It seems that Ca and P are deposited in a nearly constant ratio regardless of completeness or incompleteness of bone formation, Ca : P ratio of the diet, body weight or rickets.

The chief inorganic Ca salts in bone are still undetermined. The old theory of a simple mixture of $Ca_3(PO_4)_2$ and $CaCo_3$ has been proved incorrect and it seems unlikely that $CaHPO_4$ is present in more than small amounts, if at all. Most experimental evidence points to the Ca being present as complex salts such as carbonate-apatite [$nCa_3(PO_4)_2CaCo_3$] and hydroxylapatite [$Ca_3(PO_4)_2.Ca(OH)_2$ and $CaCo_3$].

Mg in bone is somewhat variable, an average value being from 0·8 % to 1 % of the ash. Where diets are greatly deficient in Mg the bone content is also below normal but increases in amount during growth, suggesting that bone has a greater attractive force than any other tissue for Mg, though it is subjected to release from the bone during the convulsions associated with the deficient diet.

Many if not all substances present in the body fluids are deposited in new bone. In poisoning with lead, fluorine or radium, these substances accumulate in the skeleton. From a broad standpoint bone formation cannot be regarded merely as calcification, but as a precipitation of poorly soluble salts in living tissue. Apatite deposition is quantitatively the greatest because the concentration of the apatite components in body fluids is greater than that of any other poorly soluble substance.

Bone Cell Function.—Bone may be separated into two functional divisions, *viz*, growth zones (epiphyseal plate, subperiosteal region, trabeculae and fracture callus) and dense cortical bone. The growth zones are characterized by many more osteoblasts (the specific cells engaged in bone formation), much greater circulation, greater percentage of organic material, more dissociation and greater Ca ion concentration. The older calcified areas of cortical bone are in great part sequestered from the circulation by an organic matrix which hinders absorption.

The growth hormone of the anterior pituitary is closely related to bone growth. Thyroxin increases the excretion of Ca, but its mode of action is unknown. Parathyroid hormone has a peculiarly intimate association with bone, its effect on Ca metabolism being due apparently to direct action on the bones.

Calcification ceases because of insufficient Ca or PO_4 in the body fluids, and in food starvation. In diets deficient in protein or having a low salt content skeletal growth is less than 20 % of the normal, the bones being osteoporotic but heavier due to increased amount of organic matter. Bone formation is interfered with in water deprivation, deficiency of fat-soluble vitamins and various infections and intoxications.—A. Robertson.

Lewis, T. (1937). **The Nocifensor System of Nerves and its Reactions.**—*Brit. med. J.* Feb. 27th. 431-435 and March 6th. 491-494. 5 figs. [Num. refs.]

On the basis of some recent discoveries L. believes that the outer surface of the body (including skin and mucous membranes) is supplied by a hitherto unsuspected system of nerves associated with local defence against injury.

These nerves, which have been named " nocifensor " nerves, appear to be concerned in the following reactions.

(a) Spreading hyperalgesia from local injury, as occurs around abrasions, insect bites, inflammatory lesions, etc.

(b) Hyperalgesia from distal stimulation of cutaneous nerves.—This has its clinical counterpart in certain cases of peripheral nerve lesions which are

followed after a latent period by the skin of the region supplied by the nerve becoming very tender to friction and intolerant to warmth.

Phenomena analogous to the above but affecting vascularity have already been intensively studied, *viz*,

(c) Flare from Local Injury – part of the " triple response ".

(d) The " Antidromic " Flush, associated with stimulation of the distal ends of cut posterior nerve roots. L. now thinks that these are also associated with this nocifensor system of nerves. The system is also claimed to be responsible for

(e) Hyperalgesic and Vascular Responses to Cold.—A protective mechanism against overcooling, found in the fingers, toes, lobes of the ears, nose etc., *i.e.* parts of the body which project and are easily cooled.

In each case the reaction occurs as a local axon reflex in nerves belonging to the posterior root system. Tissue products of injury appear to be responsible, acting through local nerve channels, the impulse travelling up a nerve fibre and returning shortly through a side branch. The axons in question divide freely, forming complex overlapping networks in the skin. Their action in the case of hyperalgesia is to produce an altered state of the skin cells, resulting ultimately in a reduction of the threshold of sensory nerves subserving pain.

Though present in the posterior root system the nerves are distinct from those conveying sensory inpulses and are capable of effecting changes in the skin locally without reference to the C.N.S. (though, possibly, they may be capable of excitation from brain or cord). They appear to exercise no direct influence upon the nutrition of the skin. Their action is more akin to a process of secretion–liberating potent substances from cellular elements of the skin into surrounding spaces and thus controlling, partly or wholly within the skin, important elements of defence including inflammation.—A. Robertson.

Monti, D., & Bordiga, R. (1935). Accrescimento e modificazione dei neuroni dei gangli spinali in relazione con l'età nei mammiferi domestici (Bos taurus). [**Growth and Change in the Neurons of the Spinal Ganglia according to Age in Cattle**].—*Nuova Vet.* **13.** 149-153 and 199-206. 2 text figs., 7 figs. on 2 plates, 8 tables.

M. and B. made observations on five embryos, from 58 days to 8 and a half months old, also on a calf 20 days old, a bullock 2 years old, and a full-grown animal 10 years old. He describes in detail the results of his examination of the spinal cord, medulla and ganglia of two of the embryos, illustrating his descriptions with tables and plates. He proposes to complete the details of his researches in a future article.—S. F. J. Hodgman.

Di Monaco, F. (1936). Sulla formula leucocitaria nel bufalo. [**Leucocyte Formula of Buffalo**].—*Profilassi.* **9.** 14-16. [French and German summaries].

Di M. is the first to attempt to find a " normal leucocyte formula " for buffaloes. He used 11 buffaloes of both sexes, their ages rising from 6 months to 12 years. Blood was taken from the tail of each and placed on prepared slides.

He classifies the leucocytes under the following five headings :– (1) lymphocytes ; (2) large mononuclear leucocytes ; (3) transitional forms ; (4) neutrophiles, and (5) eosinophiles, and gives in detail the percentages found in each case. The figures vary considerably, lymphocytes and neutrophiles being the most numerous. His conclusion is that buffaloes show marked individual variations.—S. F. J. H.

Barcroft, J., & Barron, D. H. (1937). **The Development of the " Righting " Movements in the Foetal Sheep.**—*J. Physiol.* **89.** 19P-20P.

The authors studied foetal movements in sheep embryos between the 40th and 64th days of intra-uterine life. Both spontaneous movements and those in response to external stimuli resembled an attempt on the part of the foetus to right itself and stand up. These " righting " movements were best developed about the 49th day and were later suppressed along with general activity. No details are given. —A. Robertson.

I. Busch, G. (1936). Der Nachweis der Trächtigkeit bei Stuten und Rindern mit chemischen Methoden. [**Chemical Diagnosis of Pregnancy in Mares and Cows**].—*Tierärztl. Rdsch.* **42.** 780-782. 4 tables.

II. Argun, T. (1936). Die Diagnose der Trächtigkeit der Stute mittels der Reaktion nach Cuboni. [**Cuboni's Pregnancy Test for Mares**].—*Ibid.* 815-816. [6 refs.]

I. B. carried out a series of experiments to determine the comparative values of different methods for the diagnosis of pregnancy. He concludes that Sdrodowsky's method, Manoiloff's serum reaction and Visscher and Bowman's method are of no value for the diagnosis of pregnancy in domestic animals. In mares, after the fifth month of gestation, Cuboni's method gives satisfactory results. It is, however, valueless for the diagnosis of pregnancy in cows. The technique of the different methods is briefly described.

II. The results of clinical examinations and of Cuboni's pregnancy diagnosis test were compared. Twenty mares were examined. Whereas clinical examinations gave incorrect or doubtful results in a number of cases, in no case were the results of Cuboni's test at fault. The examinations were made between the sixth month of gestation and parturition, or were discontinued when it became evident that the mare was sterile. [Diagnosis can be made by a clinical examination long before the sixth month].—J. A. Nicholson.

Young, D. (1937). **The Presence of Copper in Lambs' Livers.**—*Vet. J.* **93.** 51-55. [8 text refs.]

This paper is essentially an analyst's report by Mr. A. Sciver, B.Sc., F.I.C. Copper determinations made upon the livers of 30 imported and of 7 home-produced lambs showed figures ranging from 21·6 to 510 p.p.m. dry matter, with an average of 141 ; 10 human livers gave value values from 5·2 to 126. These are in fair agreement with those obtained by Cunningham [(1931). *Bio-chem. J.* **25.** 1267.] who is extensively quoted and S. considers that Cu can be present in normal imported lambs' livers to the extent of at least 500 p.p.m. dry matter.—A. Eden.

Errington, B. J. (1937). **Variations in Inorganic Phosphorus and Calcium Content of the Blood of Horses.**—*Cornell Vet.* **27.** 1-13. 2 figs., 5 tables. [Numerous refs.]

The mean concentration of inorganic P in mg. per 100 c.c. of serum for 8 colts between 23 and 43 weeks old, and 7 colts of from 2 to 3 years old was 4·95 and 5·13 respectively, while a group of 98 mature horses of 4 years and over gave a mean value of 3·55. The Ca values for the same three groups remained practically constant at 12·81, 12·95 and 12·67 mg. respectively.

Samples taken at hourly intervals throughout the day showed that there was considerable fluctuation in the concentration of serum in organic P, but not in Ca. These variations were probably related to the food intake since they were similar in groups on the same feeding schedule.

Horses with symptoms of bone disorders showed no significant change in the Ca concentration and only a slight and irregular decrease in the inorganic P.
—R. Allcroft.

TECHNIQUE.

Stark, C. N., & Curtis, L. R. (1936). **A Critical Study of Some of the Growth-Promoting and Growth-Inhibiting Substances Present in Brilliant-Green Bile Medium.**—*J. Bact.* **32.** 375-384. 4 tables. [Numerous refs.]

A medium consisting of lactose 1%, peptone 1%, ox bile 2%, and brilliant green 0·00133%, as recommended for the detection of *Bact. coli*, was examined. It was found to inhibit the growth of spore-producing organisms capable of fermentation, but it did not inhibit all other organisms, and a wrong result was possible through fermentation produced by " synergism " among these organisms.

The ox bile reduced the toxicity of the brilliant green and allowed the growth of organism of the *coli-aerogenes* group. This reduction of toxicity appeared to depend upon the amount of protein and, if milk was added in the proportion of 1 c.c. to 14 c.c. of the medium, growth became possible for a larger variety of organisms capable of synergism, and also for the spore-producing organisms.
—H. H. Holman.

I. Leifson, E. (1936). **The Preservation of Bacteria by Drying in vacuo.**—*Amer. J. Hyg.* **23.** 231-236. 1 fig., 1 table. [12 refs.]

II. Greves, R. I. N., & Adair, Muriel E. (1936). **A Simple Method for the Preservation of Sera by Desiccation in the Frozen State without the Use of Refrigerants.**—*J. Hyg., Camb.* **36.** 507-513. 1 table. [6 refs.]

I. A new apparatus for drying bacteria *in vacuo* consists of a thick rectangular museum jar, fitted with a glass cover 1 cm. longer than the jar. By sliding the cover, a hole, drilled 6 mm. from one end, can be placed either inside or outside the area of the jar.

A nozzle, connected to a pump, is placed over the hole and sealed there with heavy grease. The jar is then evacuated and sealed by moving the cover so that the hole is outside the area of the jar.

The jar contains Ca chloride and a manometer. Full technique is given and also notes on the viability of organisms exposed to this treatment.

II. A process is described by which as much as 21 c.c. of serum can be dried in a desiccator 8 in. in diameter. The serum is distributed into vaccine bottles, the 25 c.c. size holding 5 c.c. of serum, and these are placed in a desiccator connected to a high vacuum pump.

The pressure is reduced to 2 cm. of Hg. and then slowly decreased by stages over a period of 15 minutes, until no further bubbles occur. This preliminary evacuation in the absence of a drying agent avoids the occurrence of frothing.

Air is then re-admitted and the bottles are quickly transferred to a second desiccator charged with P_2O_5, and brought to a high vacuum.

The rapid evaporation of the serum, and its consequent freezing, takes place with very little frothing.—H. H. Holman.

Weinberg, M., & Schneiter, P. (1936). Appareil pour la culture des microbes anaérobies. [**Apparatus for the Culture of Anaerobic Bacteria**].—*C. R. Soc. Biol. Paris.* **122.** 1048-1050. 1 fig.

A glass jar containing dry pyrogallol and dry caustic soda is fitted with a

two-way tap. With the tap in one position, passage is given to a tube connected with a vacuum pump. The air is pumped out of the jar and the tap is turned to the other position, and boiled water is sucked into the jar, and runs down a funnel to come into contact with, and activate, the dry chemicals. The tap is then turned to the half-way position, making the jar air-tight.—H. H. Holman.

I. Peragallo, I. (1936). Experimentelle Untersuchungen über die zur keimfreien Filtration dienenden Filterkerzen. [**Filter Candles for Preparing Bacteria-Free Filtrates**].—*Zlb. Bakt. I.* (*Orig.*). **137.** 465-471. 6 figs. [6 refs.]

II. Perini, P. E. (1936). Bemerkungen über die Verwendung von Filterkerzen. [**Use of Filter Candles**].—*Ibid.* 472-474. 1 table. [1 ref.]

I. A simple microscopic technique is described for examining the physical properties of the common types of filter candles. For the best results the pores should be circular, the greatest diameter not exceeding 28μ, the optimum being between 20 and 15μ. The most satisfactory number of pores is 15 to 30 " per standard field ".

II. Perini shows in a number of experiments that the efficiency of filter candles depends upon porosity, permeability and dimension of the pores of the substance from which the candle is made. He discusses also the nature of the culture medium and the temperature at which filtration is carried out as matters that influence the passage of bacteria.—N. J. Scorgie.

Bauer, J. H., & Pickels, E. G. (1936). **A High Speed Vacuum Centrifuge Suitable for the Study of Filterable Viruses.**—*J. exp. Med.* **64.** 503-528. 14 figs., 5 tables. [Numerous refs.]

An air-driven centrifuge recently prepared by B. and P. attained a speed of 16,000 R.P.M. They found that some degree of sedimentation of vesicular stomatitis virus was attained, but not of yellow fever virus. They have now constructed an apparatus capable of over 25,000 R.P.M. by enclosing the rotor in a very high vacuum. Precise details of its construction are given. At this speed a large proportion of yellow fever virus is thrown down.—R. E. Glover.

Schartum-Hansen, H. (1936). Ergänzung zu " Hämoglobinbestimmung durch Hämatokrit " (Folia Haematologica, Bd. 54, S.22-26). Eine leichte Methode zur Umrechnung der Thrombocytenzahl vom Plasma in Blut. [**A Simple Method of Estimating the Number of Thrombocytes in Blood**].—*Folia haemat.* **54.** 385-386. [1 ref.] [Copied *verbatim* from *Trop. Dis. Bull.* **33.** 800. Signed H. H. S.]

The author has worked out a formula for converting the thrombocyte total as found in the plasma to that present in the blood. It is based on the standard that with 100 per cent. haemoglobin one regards 5 million erythrocytes per cmm. as equivalent to 18·5 per cent. oxygen or 43 volumes per cent. and that 100 per cent. Hb = 13·8 gm. per cent. He finds that the Hb percentage divided by 2·6 gives the volume per cent., and from this the formula :–

$$\frac{\text{Thrombocytes in plasma} \times (100 - \text{vol. per cent.})}{100}$$

gives the thrombocyte total in the blood [the *minus* sign in the numerator is erroneously given as a division sign ÷ in the text]. For example, a man 25 years, in apparent health, had Hb 115 per cent., plasma thrombocytes 650,000. The volume per cent. would be 115 ÷ 2·6 or 44·2. Then by the formula :–

$\frac{650{,}000 \times 100 - 44{\cdot}2}{100}$ = 362,700 thrombocytes in the blood. A second example; a woman of 50 years with lymphocytic leukaemia, had Hb 32 per cent., and plasma thrombocytes 40,000. The volume per cent. is 32 ÷ 2·6 or 12·3 and by the formula $\frac{40{,}000 \times (100 - 12{\cdot}3)}{100}$ = 35,080 thrombocytes in the blood.

MISCELLANEOUS.

I. Smith, J. A. B. (1937). **Biennial Reviews of the Progress of Dairy Science. Section A. Physiology of Dairy Cattle. I. Reproduction and Lactation.**—*J. Dairy Res.* **8.** 105-118. [Numerous refs.]

II. Morris, S. (1937). **Biennial Reviews of the Progress of Dairy Science. Section A. Physiology of Dairy Cattle. II. Nutrition.**—*Ibid.* 119-131. [Numerous refs.]

III. Smith, A. D. B. (1937). **Biennial Reviews of the Progress of Dairy Science. Section A. Physiology of Dairy Cattle. III. Genetics.**—*Ibid.* 131-142. [Numerous refs.]

These are discussed under the following heads :–

I. General, hormones, biochemical aspects, biophysical aspects, and factors affecting milk secretion.

II. Physiology of digestion, energy metabolism, mineral metabolism, rationing, and protein metabolism.

III. General, butter fat and other constituents, conformation, efficiency of production, pedigree, breed construction etc., proven sire and tropical climate.

—J. E.

Ježic, J. (1936). Veterinarstvo u Turskoj. **[Veterinary Medicine in Turkey].**—*Jugoslov. vet. Glasn.* **16.** 67-77. 9 figs.

A short report is given of J's visit to Turkey, with special reference to the present veterinary position in that country. The veterinary organization is both modern and satisfactory. The Veterinary Head Office is a department of the Ministry of Agriculture. It is divided into sections governing all branches of veterinary functions. Turkey possesses modern legislation for Animal Contagious Diseases Control, dating from 1931. Since rinderpest was successfully eradicated, the export of livestock has increased gradually. The country also exports a large quantity of eggs. The main diseases which at present need careful attention are :– rinderpest (eradicated since 1933), anthrax, foot and mouth disease, sheep pox, glanders, rabies and fowl cholera. Among parasitic diseases liver fluke infestation must be mentioned specially.

Particular attention is drawn to veterinary education. There is a new veterinary college at Ankara. There is one modern veterinary laboratory at Pendik, Stamboul, and another, a large one, at Etlik, in addition to three smaller ones at Erzindjan, Smyrna and at Mersin. The number of veterinarians is about 400.

—B. Oswald (Skoplje).

Nagakura, Y., & Aggarwala, A. C. (1936). **Veterinary Education in Japan.**—*Indian vet. J.* **13.** 144-147.

Two of the five imperial universities of Japan have veterinary faculties – those at Tokyo and at Hokkaido. Students attend a three years' course, each year being divided into two terms. The degree conferred is Bachelor of Agriculture

(Veterinary). There are also a few private veterinary schools with a similar curriculum, at which the students are trained, entirely in Japanese, whilst at the Universities, European text-books are also used.—J. E.

GRAHAM, R., & MICHAEL, V. M. (1936). **Studies on Incubator Hygiene. VI. A Note on the Resistance of S. pullorum on Sterilized and Unsterilized Egg Shells. VII. Results of Fumigation of S. pullorum in Incubators at Full Capacity. VIII. The Resistance of S. aertrycke, S. anatum, and Salmonella from Quail to Formaldehyde Fumigation.**—*Poult. Sci.* **15.** 490-491, 492-493 and 494-495. 3 tables. [15 refs.] [See also *V. B.* **6.** 775].

S. pullorum was generally non-viable after fumigation for 40 minutes with formaldehyde (20 c.c. of formaldehyde on cheesecloth per 100 cu. feet), though in one experiment the organism survived for 100 minutes. The number of eggs in the incubator appeared to make no difference.

Cultures of *S. pullorum* were placed on cotton squares at different levels in the incubator. In these experiments formaldehyde fumigation was as effective when the incubator was empty as when it was carrying a 50% egg capacity, the organisms being killed by 15-150 minutes' exposure.

S. aertrycke and *S. newport* on cotton squares survived formaldehyde fumigation in a forced-draft incubator for 30 minutes, but were non-viable at 60 minutes, while the quail salmonella survived for 60 minutes but were non-viable at 90 minutes.—D. L. HUGHES.

CAMERON, A. E. (1936). **The Health of Animals [Branch] and its Relation to Public Health [Canada].**—*Canad. publ. Hlth J.* **27.** 218-221. [Also appeared in *Vet. J.* **92.** 409-414].

The Health of Animals Branch is primarily concerned in preventing the introduction of disease into Canada, and in controlling outbreaks which may occur within the dominion. The branch also administers the Meat and Canned Foods Act which relates to exports, and the Pathological Division prepares biological products, examines specimens, and conducts research. These activities have a definite value in regard to public health, through the control of diseases transmissible to man (*e.g.*, rabies, anthrax, TB. and bovine contagious abortion), and there are additional safeguards through meat inspection, and the testing of cattle for TB.

The control of TB., started over 30 years ago, now involves the testing of about 1,000,000 cattle annually and in certain large areas infection has been reduced to less than 0·5%. Stock-owners are offered co-operation in eradicating B.C.A. and at the present time over 1,350 herds are under supervision. It is estimated that 20% of the herds in the dominion are infected, and reactors to the blood test, except unbred yearlings and calves, are permanently marked for identification. Under the Meat and Canned Foods Act, 160 veterinarians are employed in meat inspection, The compulsory slaughtering of animals in municipal abattoirs is advocated. Trichinosis is stated to be more prevalent than is usually supposed and it is estimated that 20% of the people in the North-Eastern States of the United States of America are infected. Fortunately a skin test has been discovered which should simplify diagnosis.—J. M. L. PENHALE.

ANON. (1936). **American Public Health Association Year Book, 1935-1936.** pp. 286. 71 figs., 9 tables. [Numerous refs.] New York: *Amer. Publ. Hlth Ass.* [8vo].

This is the sixth annual report of the association and gives full details of the

constitution, organization, list of committees and also general articles on public health, amongst which are several on veterinary aspects. Those of veterinary interest have been dealt with in the *Veterinary Bulletin*.—J. E.

OFFICIAL AND OTHER REPORTS.

PALESTINE. (1936). **Chief Veterinary Officer's Report [for the Year ending March, 1935].** [SMITH, J. M.]—*Rep. Dep. Agric. Palestine, 1935.* pp. 47-63.

The previous year's drought caused great grazing difficulties during the summer. Good winter rains followed, however, and prospects greatly improved. No serious outbreaks of epizootic diseases were experienced.

ANIMAL DISEASES.—71 outbreaks of ANTHRAX were reported, in which 538 animals died. 14,766 vaccinations were carried out. The incidence of BOVINE TUBERCULOSIS remained low but it will increase unless control measures are introduced. A plan for control and eradication has been submitted to the Government. 64 herds are now regularly tested in connexion with the control and eradication of BOVINE CONTAGIOUS ABORTION. Only two cases of EPIZOOTIC LYMPHANGITIS were reported. Control measures for DOURINE involved the testing of some 3,600 horses, with positive results in 111 cases. Infected stallions are castrated and infected mares are branded, and breeding is prohibited. No FOOT AND MOUTH DISEASE occurred after September, 1933. There were 26 outbreaks of SHEEP POX and GOAT POX; 11,500 animals were affected, and the mortality was 4%. A marked increase occurred in the incidence of rabies during the year. 21,000 stray dogs, cats and jackals were destroyed. 631 suspected rabid animals were placed under observation and 11 developed rabies. Good results were obtained in the control of TICK-BORNE DISEASES where regular dipping was carried out. It is intended to build a large number of additional dips at Jewish settlements. Demonstration dipping of sheep and goats was carried out at 14 centres on 15,000 animals, and native stock-owners are becoming convinced of the value of regular dipping. Various methods of encouraging the construction of small animal dips, by means of free issue of dips and of government loans, are being put into operation. No major epidemic in DISEASES OF POULTRY occurred. Good results followed the extensive use of pigeon-pox virus vaccine.

ANIMAL QUARANTINE SERVICE.—The main quarantine station is at Haifa. 256,570 animals passed through this station. Fourteen land frontier stations received 134,228 animals.

ABATTOIRS.—Veterinary surgeons carried out meat inspection in 13 abattoirs and in 20 others trained meat inspectors were employed. A total of 352,412 animals were slaughtered under this inspection.

ANIMAL HUSBANDRY.—A further expansion occurred in the dairy industry and the demand for high-producing cows was very great. At the Government Stud Farm a herd of Lebanese cows was established and a small Kerry herd. Boaz cows imported from Turkey produced some excellent calves. Forty bulls were distributed on loan to selected villages. A government premium scheme was continued and expanded, in conjunction with castration of village bulls. The Scotch Black-Face sheep introduced two years ago proved unsuitable, as they did not acclimatize well. Karakul sheep showed considerable promise. Swine, donkey and mule breeding proceeded and the two arab stallions have been in demand. Poultry-breeding and apiculture have received considerable attention.

GENERAL.—The army and police services received veterinary advice.

ANIMAL CENSUS 1934.—16,355 horses, 7,481 mules, 75,784 donkeys, 32,033 camels, 130,804 cattle, 4,540 buffaloes, 188,267 sheep, 380,511 goats and one and a half million head of poultry.

PALESTINE. (1936). **Palestine Government Veterinary Laboratory. Report by the Veterinary Pathologist [for Year ending March, 1935].** [GILBERT, S. J.] —*Rep. Dep. Agric. Palestine, 1935.* pp. 64-68.

A total of 27,192 specimens was examined. Various vaccines and antisera were prepared. Over 1,400 specimens were examined in connexion with a free diagnosis service. 160 of 20,461 blood samples received in connexion with the department's control scheme were positive for *Br. abortus*, and 149 of 1,015 private samples and 29 of 552 samples from cattle in quarantine were also positive.

109 of 3,607 samples of horse blood were positive (c.f. test) for DOURINE. 192 of 285 samples of material were positive for ANTHRAX. Two cases of EPIZOOTIC LYMPHANGITIS were detected.

FOWL POX, FOWL CHOLERA and FOWL TYPHOID were all diagnosed.

PULPY KIDNEY DISEASE OF LAMBS was diagnosed for the first time in Palestine during the year, five outbreaks with losses of 78 lambs being observed. COCCIDIA were detected in one bovine and in a few goats.

RESEARCH.—Notes are given on PULPY KIDNEY DISEASE [*V. B.* **5.** 337.], TICK FEVER (theileriasis) [*V. B.* **5.** 807.], and on CELL INCLUSION DISEASE OF FOWLS [*V. B.* **5.** 76.] and brief mention is made of coccidia in goats, calf diseases and the differentiation of goat and camel flesh.—J. M. SMITH.

TUNIS. (1936). Tunisie. Rapport du Chef du Service de l'Elevage pour l'année 1935. **[Report of the Veterinary Service, Tunis, for 1935].** [COTTIER].—*Bull. Off. internat. Epiz.* **13.** 235-241. 1 table. [1 ref.]

The report deals with animal diseases in the territory and with the work of the Arloing Research Institute.

ANIMAL DISEASE.—ANTHRAX and BLACKLEG were only rarely seen and now give very little trouble. BOVINE TUBERCULOSIS appears to be spreading, 47 cases having been seen in 1935. Imported cattle are tuberculin-tested, but hygienic conditions in the country are poor. JOHNE'S DISEASE occurred here and there. The incidence of BOVINE BRUCELLOSIS was dealt with by aggl. and skin testing. A live vaccine was used in two herds. No case of DOURINE has been observed since 1933. Premunition against BOVINE PIROPLASMOSES is offered at cost to live-stock owners, but only 150 cattle were so treated in the year. FOOT AND MOUTH DISEASE appeared in cattle recently imported from France and spread in the north of Tunisia in a benign form in the indigenous cattle. Sheep pox was less prevalent than in the previous year, 44 outbreaks having been detected: free vaccination is carried out for its control. RABIES remained uncontrolled, 50 cases in dogs, two in cattle and five in donkeys having been seen. SHEEP SCAB and GOAT MANGE were combated as previously by dipping. Brief mention is made of other diseases including helminthiases and fowl diseases.

RESEARCH.—Work on premunition against and chemotherapy of JOHNE'S DISEASE is recorded: no useful results were obtained. Experiments on the diagnosis and chemotherapy of BRUCELLOSIS are referred to [no details]. Attempts to cure THEILERIASIS (*Th. dispar*) with gonacrine, " anthiomaline " and " progone " were unsuccessful. Attempts to prevent PHOTOSENSITIZATION in sheep, rabbits and g. pigs by " antifluorescent " preparations and by artificial pigmentation of the skin were not successful. Mention is made of an OSTEOPOROSIS of pigs which is said to be due to a virus. Reference is also made to research on POULTRY DISEASES.

—J. E.

I. ANON. (1936). **Report of the A. V. M. A. Representative to the National Research Council.**—*J. Amer. vet. med. Ass.* **89.** 405-406.

II. ANON. (1936). **Report of the Committee on Legislation [A. V. M. A.]**—*Ibid.* 433-434.

III. ANON. (1936). **Report of the Committee on Proprietary Pharmaceuticals [A. V. M. A.]**—*Ibid.* 460-465.

IV. ANON. (1936). **Report of the Committee on Resolutions [A. V. M. A.]**—*Ibid.* 458-459.

V. ANON. (1936). **Report of the Committee on Veterinary Biological Products [A. V. M. A.]**—*Ibid.* 459-460.

VI. ANON. (1936). **Report of the Committee on Education [A. V. M. A.]**—*Ibid.* 476-497.

I. The Division of Medical Science of the National Research Council appointed a committee to study brucella infection. The names of the members are given: Prof. K. F. MEYER, California, is the chairman.

The Committee on Soil Microbiology, which had been studying the viability of avian tubercle bacilli in soil, was disbanded. The Committee on Sex Problems continued work. The Division has appointed an Advisory Committee on Research in Endocrinology. The Advisory Committee in a Survey of Tropical Diseases brought out a report on the geography of disease [*V. B.* **7.** 237].

II. No special legislation was sought for during the year. Comment was made on the failure to have a veterinarian appointed to the Committee on Milk Hygiene of the United States Public Health Service.

III. The committee records its nine years' activities. In the past year it assisted in the work of the U. S. Food and Drug Administration, giving evidence on many proprietary preparations. The Administration is endeavouring to suppress "quack" medicines. The committee also gave advice to farm magazine owners about accepting advertisements for publication, and assisted in the preparation of the revised 11th edition of the United States Pharmacopoeia.

IV. A resolution was passed, requesting the Secretary for Agriculture of the United States government to prohibit inter-state traffic in biological products.

V. The committee has divided commercial veterinary biological products into three groups:—(a) those products possessing value, (b) those in the experimental stage, and (c) those possessing no value. A list of preparations under group (a) is given.

VI. In response to an enquiry as to what constitutes a Class "A" veterinary college, the late Prof. C. H. STANGE prepared a survey of veterinary colleges in North America and published his findings as Bulletin No. 9 of the Survey of Land Grant Colleges and Universities. Most of the report is devoted to a statement on the policy relating to classification of veterinary colleges, education and facility standards being laid down. A suggestion for the curriculum is given. A long discussion followed at the meeting at which the report was presented.—J. E.